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DIGEST**



APRIL 1982

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TOP OF THE MONTH

F4 was on station and providing service on March 1st. W4 has a 'text-book' launch and will be tested and checked out at a temporary location of 79 degrees west before formally replacing W1 at 99 west. Life in the satellite world gets busier and busier!

Meanwhile, over in Africa, that Caribbean explorer, Bob Behar, has introduced satellite TV to a whole new continent. Bob writes about installing a 20 foot terminal in (French) Cameroon in this issue and the amazing results he had, even viewing US originated NTSC television there!

Everything around us, and above us, is changing. HBO formalized their own scrambling plans, and then got a bunch of naughty words tossed their way by a competitor; Warner-Amex. Warner called HBO's plan "foolish", and the battle of words is on creating division in the cable ranks.

David Barker, the chap who made single conversion mass-production receivers possible (see June 1980 **CSD**) is with us this issue with some 'video tips' for those with older Howard/Shuch style receivers. Attention to video handling, after demodulation, is growing.

The F4 signals appear to be very healthy. The same transponders which are 'stout' on F3R seem to be 'stout' on F4, indicating that the F3R results recorded and reported here (see March 1982 **CSD**) are 'family' related. At least for now, all Satcom birds seem alike.

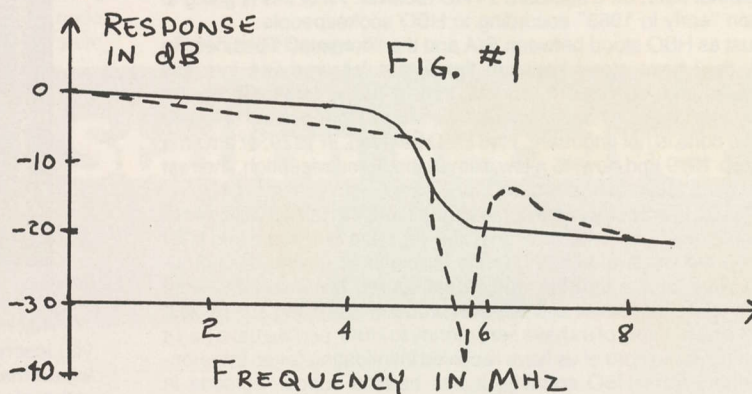
The inauguration of W4, testing at 79 as you read this, but destined for 99 in just days, will be a very unusual exercise to watch. Don't miss it!

APRIL 1982

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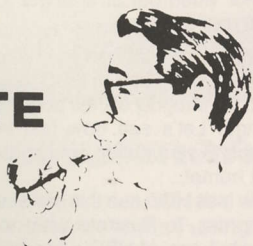


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COOP'S SATELLITE DIGEST



COOP'S SATELLITE DIGEST published monthly by West Indies Video, Ltd; a Turks & Caicos Corporation with corporate offices located at Grace Bay, Providenciales, Turks & Caicos Islands (West Indies). U.S. offices are maintained at Ft. Lauderdale, Florida. All mail including subscriptions, advertising inquiries, reports and letters should be addressed to CSD, P. O. Box 100858, Ft. Lauderdale, FL 33310. CSD office hours in Ft. Lauderdale are Monday - Friday 9:00 AM to 4:00 PM. Telephone (305) 771-0505. CSD is mailed worldwide on or before the 1st of each month, first-class (airmail). Annual subscription rates are \$50 (US funds) for USA, Canada, Mexico; \$75 (US funds) elsewhere. Entire contents copyright 1982 by West Indies Video, Ltd; Robert B., Susan T., Kevin P., and Tasha A. Cooper.

COOP'S SATELLITE COMMENT

*HBO On Scrambling

*Betamax Revisited

*More Technical

HBO ON SCRAMBLING

Home Box Office made the front page of the *Wall Street Journal* recently when they announced at a regional cable TV show that "yes indeed, they would scramble." We wrote the same words last fall and we didn't make even the back of WSJ. Obviously, in this world, it is not what you say, but, who says it.

HBO is painfully inept when it comes to dealing with a relatively simple problem; such as program security. It was HBO and only HBO that shut down Scientific Atlanta when S/A attempted to pioneer this business back in the spring of '79. SA did everything they could, including using corporate muscle, to talk HBO into authorizing home terminals. HBO would not budge, and S/A dropped out.

HBO will install some form of 'addressable' descramblers. They will pay for them out of their own pockets, at about \$1500 or so a pop. They will scramble the video, and, transmit the audio using a digital technique. The effect will be a picture you cannot watch, and audio you cannot hear, on a standard TVRO receiver. All of this is going to happen "early in 1983" according to HBO spokespeople.

Just as HBO stood between S/A and the "homesat"® business in 1979, they have stood between those that followed S/A into this business, and legalized full home use of home terminals, in the intervening years. What Showtime, The Movie Channel and so on do or have done is not important. Had HBO decided, in 1979, or anytime between 1979 and now, to allow authorized home reception, the rest would have fallen in line too.

SPACE has attempted to come to grips with this lack of willingness to negotiate a home user rate. Just one year ago Showtime and HTN were on the verge of allowing home terminals to pay for their programs. They tell me that the whole deal soured because HBO went around to the back door of the movie producer folks and stirred up a hornet's nest. Many of us have sent money to HBO, and we have had it returned. Many more of us have received intimidating (even threatening) letters from HBO counsel. It has been a curious episode in American life that willing customers, cash laden, standing at the shop keeper's door, are called thieves and pirates. SPACE may even be coming around to some of my earlier thinking; let's take the bastards to court and make a case for anti-trust manipulation of the marketplace!

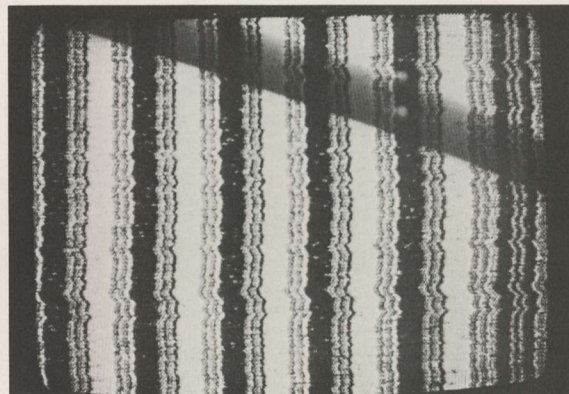
Well, HBO **should** scramble. BUT — they should at the same time offer the service to home terminals who are willing to pay for it. No chance of this; HBO made it very plain, in the WSJ story and in the cable trade press, that they will not be offering descrambler equipment to the home terminals. Nor to any MATV systems or others with whom they elect not to trade. It is a curious use of a public resource, the airwaves/frequency spectrum, that one firm can treat it as if they own it privately.

I believe it may well be time to thump the Jolly Green Giant's big toe.

I believe HBO is engaging in this scrambling 'exercise' just to impress the movie folks, and probably a few Time, Inc. stockholders. I think it would be a mistake to allow them to get even one penny of worthwhile PR out of this. I propose that we turn the tables on them and see to it that they get several cents worth of bad PR for their scrambling 'effort.'

Now if you have been aligning new satellite antennas recently, you may have stumbled upon a signal on the F2 satellite (TR18), or the D2

satellite or even the new F4 satellite (TR18) which looks like the photo here. That's HBO testing. They are testing a **part** of the scrambling system they propose to put into operation come early next year. HBO claims they have a dozen or so different scrambling systems to test before they select the 'lucky' design and award a contract for delivery of 3,500 or so units. They also claim they will test each of the potential systems, using the above mentioned transponders plus TR22 on F3R, from time to time.



That means that you can stumble across these transmissions as you test new equipment, and perhaps stop long enough to analyze what it may be; or not be. The photo shown here, for example, has all of the relevant sync information present. It even has color burst. What it does **not have** is any video information HBO has been messing around stacking up to five separate audio (voice) channels in a single video channel, and if you look carefully at the pattern in this particular transmission you will notice that there is a digital reference signal at far left followed by five separate digital audio channels to the right. We heard several people talking about decoding this into video recently, on the amateur radio satellite net. We wish them well. Anyone that can get color video out of a single audio channel, repeated five times, exhibits true genius!

Not that some will not try. Which brings me to the challenge of the HBO scramble game. If HBO will **not** deal, I wonder why we should respect the integrity of their scrambling? Which says let us accept their challenge. Let's see how fast we can break their mickey-mouse approach to scrambling, and spread the information on doing it yourself, at home!

Now less HBO see this statement as a delightful quote to trot over to Congress, to illustrate what terrible people we are, allow me to quote what one of HBO's competitors said recently about the HBO scrambling exercise. Speaking is Warner Amex technology VP Andrew Sitos.

"HBO has, in one foolish move, undermined the entire cable

TV industry's attempt to secure legislative protection for its programming." The 'foolish move' is HBO's approach to scrambling. Sitos believes in scrambling, as we do. But he finds much to fault in the announced HBO approach.

"The kind of (video) quality promised by HBO (after their scrambled signal is descrambled) . . . no visible deterioration of video, digital stereo, unbreakable codes . . . costs more like \$15,000 per (decoder) box, today, than the \$1,500 which HBO says is the top end of what they will pay." Sitos is right. HBO is talking about a super sophisticated system (performance), but they are quoting prices (and setting budget constraints) more akin to cheap, cable TV scrambling techniques.

Sitos cites the Oak Orion system which is now starting to be used by the Anik 2 & 3 Cancom service. It is basically the same Orion system which Oak uses for cable sales. Sitos notes "(Oak's) Orion can only offer low fidelity monaural audio, picture degradation and a breakable code." He is right. I have seen several dozen Orion code breakers operating. They all work, as well as Oak's own box, and the resulting picture is "garbage-in, garbage-out."

Sitos notes that any satellite service programmer that has big bucks at stake wants to secure his product. "But not at the tremendous sacrifice in picture quality that one gets with present systems selling for less than \$15,000 per decoder box." Then to hedge his bet, Sitos notes "even if somebody does create a system that satisfies HBO, we won't buy the same system. We want the additional security of a system that suits our needs, and is unique to our own use and users."

If HBO competitors see the HBO scrambling as "a . . . foolish move," and if HBO continues to refuse to deal with home terminal systems even after they get into a scrambling mode, that leaves us with only one course of action. To see that their adopted scrambling system does not provide them with the security they seem to expect.

With HBO planning to test the various candidate systems on the birds over the next few months, there will be plenty of opportunity for the creative people out there to have a shot at breaking their code. Then when they announce their final choice for a scrambling system,

we'll see if their 'attitude' about servicing home terminals has improved. If it has not, then we'll publish the details on breaking their code. One way or the other, we'll get their attention.

LEARNED OPTION

A fairly recent (February 6) edition of **TV GUIDE** carried the "TV Q and A" feature prepared by noted electronic-consumer-hardware authority David Lachenbruch. 'DL' is presented as an expert on home electronic gadgets and equipment, and **TV GUIDE** says they allow him to answer, in print, "the most interesting questions." That seems harmless enough.

Lachenbruch gets top dollar for his work, and one would expect him to be careful about the questions he selects, and the answers he gives. That is not always the case, however, and the February 6th issue contained the following question:

"We are thinking of installing a home satellite receiving system, but I have read that programmers are thinking of scrambling their signals so they can't be picked up by homes. Would I be taking a risk to buy one of these expensive dishes at this time?"

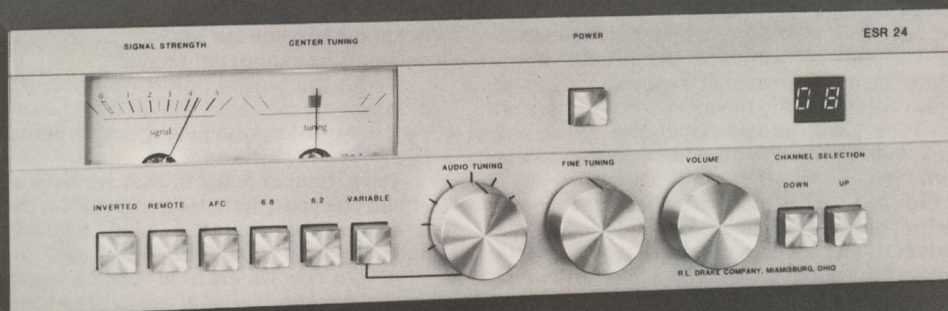
The Lachenbruch answer.

"A home satellite system generally costs at least \$3000 installed, and it includes an ugly dish antenna, maybe 16 feet in diameter. As more such systems are installed, there's more incentive for program owners to scramble their signals in order to prevent unauthorized reception. If they decide to scramble, they may decide to lease descramblers to home earth-station owners. But they may not. It's definitely a risk."

Lachenbruch obviously does not like dish antennas. He calls them ugly. His mother was probably frightened by an out of control bird bath while carrying wee David. Lachenbruch also has old reference books, suggesting that the (ugly) dish antenna may be as much as 16 feet in diameter. True, it could be. But not for the exceedingly low ball price of \$3000; installed!

CONTINUED/page 52

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INDUSTRY PROFILE

DAVID M. FEDRIC
President
National Microtech

Dave Fedric/Part Three

The January ('82) issue of **CSD** proclaimed National Microtech's Dave Fedric our industry "Man Of The Year." In our February issue we explored, with Fedric, the basic fabric of the industry's largest marketing organization.

Fedric is a very open person. He obviously enjoys what he is doing, and is anxious to discuss both his own activities and those of the very successful organization he has built with the help of others such as Horton Townes and Joe Gardner. This month we conclude our visit with Fedric by looking at the world of LNAs, the LNC units now coming on market, and the future in 1982.

New products. Let's focus on what you see happening in 1982.

"I like to be the first person to tell distributors and dealers about new products. That is a very exciting thing to be able to do, and it is fun to do; to watch people's reaction as you describe something new. Now this is getting to be a pretty competitive business, and where a year ago I might have been willing to tell you **all** I know, I am afraid that I can't do that now. I do think 1982 will be the first big year for LNCs (low noise amplifiers plus down converters in a single unit). It will happen, I feel, late in the year.

"I expect there to be a major push towards LNCs in the early fall of this year (1982). We are negotiating for 2,000 per month delivery right now.

"LNCs will change the very fabric of the industry. Dramatically, and in just a few months. You see, once you have large quantities of LNCs available, you have all of the complex microwave technology bundled up in one box, from one supplier. Each LNC will have a 70 MHz output, and that means the receiver designers will start off with a 70 MHz input; not a microwave input. With the microwave technology already done for them, this will free up engineering time and talent to work on the "bells and whistles", the gadgets that will make the receivers more consumer oriented. I think receiver designers will really go to town then.

"In my view, the big difference in receiver **performance** today is the care and skill that goes into the microwave portion. Some people, such as Andy Hatfield, have an excellent handle on this technology. Many others are out of their element here, and while they may make it work, it does not work as well as it might if they were more talented in that area. A big part of the ultimate receiver performance is made or lost in the microwave and down conversion portions.

"Now if we end up 1982 with perhaps 50% of the LNA product actually LNC product, this will have a dramatic impact on the receiver designs and the marketplace. I can take a 70 MHz input box from one supplier and mix it with an LNC from another. This will increase the marketing options greatly, and it will make it far easier for the guy doing the retail end of this business to give his retail customer a package that suits his particular needs. It will also make stepping up a customer, to a better product, or more money, far easier. The only thing you will be "changing out" will be the 70 MHz input receiver, inside the house."

Let's divert just a moment. Stepping up is something akin to the automotive "after market". Has this really caught on yet, in our young industry?

"Well, yes and no. Hayden McCullough, with his 8-Ball antenna, did this industry a real service. He put thousands of those antennas into the field and they allowed people to get started for minimum of money. Once they got pictures, they were hooked. The **mystery** of satellite reception was gone, but the **excitement** was just starting. On the other end of the pricing scheme you have the AVCOM receiver. Andy Hatfield has a great product, but it is difficult to sell high end devices to most first-time or entry-level buyers. There is a good future in this industry for people selling top quality, high end products. But that market is coming on more slowly."

Back to LNCs. You apparently feel very strongly about the LNC becoming an important part of the ultimate receiver mix.

"Yes. But I think it will be at the far end of 1982. They are here now of course. Dexcel sells them. I don't have a relationship with Dexcel so I can't say how many may be involved now; I'd be surprised if it was more than 100 per month. Then KLM did a deal with MA/COM, but I think that has gotten bogged down with KLM being overloaded with supplying their standard receivers. MA/COM might be producing another 100 per month. The sum of the two is small numbers, no matter what it is."

But you see that changing?

"Yes, no later than the fall of 1982. I won't let National Microtech jump into this until we have at least two major LNA suppliers in this product area, however. We must have at least a pair of firms available, since a second source is essential. I am not about to place our whole organization into a critical position because we cannot get product.

"With the buying power we have, when we see 2,000 per month being available, with at least two sources of supply, then we'll jump in. I see our sales going to perhaps 80% LNC systems by early in 1983."

Dave, I am concerned that we have a very real bottleneck ahead this year; that LNCs or no LNCs, the LNA parts are going to become very scarce. It is only a question of when that happens. What do you think?

"Right now we are at a position where it is very difficult to forecast accurately what will happen through all of 1982. We've seen growth in excess of 600% during 1981. I agree with you that as of late in 1981, the industry was someplace close to 2,500 complete systems per month being shipped and installed. LNAs are already tight. I can't increase my LNA input until perhaps spring. They are simply not going to be available. If we as an industry have pushed the LNA suppliers to their limits, how long will it take them to double that limit? That's the question!"

Well, double 2,500 is 5,000 per month or 60,000 per year rate. Since an LNC has a complete LNA of a sort in it, that tells us that LNC availability will impact one way or the other on stand alone LNA availability as well. If you steal LNAs to build LNCs, you'll end up short of LNAs. If you don't take enough LNAs to build LNCs, you won't get the 2,000 per month LNCs you say you will

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need to jump into LNCs. This is one tough problem!

The truth is that today we cannot support our present customers. The worst thing we could do right now would be to take on a bunch of new distributors. We have stopped our mailout program, and cut way back on promotion. These are tight, tough times. This is no joke!

"We have got to take care of our existing distributors, first. We spent a year getting them in place. The logistics involved with moving product is the big problem facing the entire industry today. We have filled our pipeline to overflow. Now we have to concentrate on making the pipeline bigger."

You touched on cutting back on promotion. Let's talk about magazines and advertising. You seem to be in every magazine that has the word "video" in it. What works, and what does not work?

We stay out of magazines like **Popular Electronics** and the electronic hobbyist magazines because these people want to

information. They simply want to get started in handling equipment. Which is, of course, why we are here.

"**TV GUIDE** is good, too, but you have to be in a position to screen the readers. We have learned that you must have a price in **TV GUIDE** advertising, or you will get thousands and thousands of letters and calls from people who quickly lose interest when they discover it costs more than \$100. You save yourself a lot of grief by telling them, up front in the advertising, that it costs more than that."

I've noticed that much of your priced advertising mentions \$1995. I know that is for the antenna system. If you read the copy it explains the buyer also needs an LNA and receiver and small accessories. Isn't that mis-leading?

"I don't think so. What we are doing is pushing for brand recognition for the Apollo series of antennas. This helps us support our dealers. The \$1995 price is the suggested list price for the antenna alone. In the advertising, we state that the LNA and receiver are not included. A reasonably intelligent reader does not expect the whole package to cost \$2,000 if the antenna costs \$1995.

"In our minds, \$1995 screens people. Then the ones who can afford that much will call, or write, and this gives you the opportunity to explain the balance of the system. If a person can afford \$1995, chances are good he can also afford \$3995. This has been our approach so far, and it generates good sales leads for the distributors and dealers. It does work.

"The \$1995 price for the Apollo series antenna establishes the worth of the system in the ultimate user's mind. Even when we are doing distributor advertising, we show the 100 lot pricing to be \$1095. Now the distributor buying ten at a time actually pays \$895. We want our distributors to do the end deals with their dealers."

Talk to me about 12 gig-a-hertz. There was a press release some months ago, from a Canadian supplier, telling the world that National Microtech had placed an order for 5,000 12 gig terminals. What is the story here?

"First of all, we did not release the story. Electro-Home of Canada is the supplier in question. They are 200 million dollar per year electronics manufacturer. They have a good reputation in the industry for making a quality product. They did a joint venture, with another group, to design a 12 gig terminal for Gensat. They also went to work on a 4 gig package; in particular, a receiver. We came along and bought the US distribution of some of the hardware. That particular 4 gig receiver will be coming in to our facility at a rate of 100 per week about the time people read this.

"When 12 gigs comes, we will be ready. We think we can make the higher band antennas ourselves. You know, this 12 gig thing is not getting the right kind of press. They say it will be the first direct broadcast from satellites. Heck, we have direct broadcast service right now! That's what 4 gig is, whether they want to recognize it or not.

"I think it will be late in 1983 or 1984 before 12 gigs is going to fly. First you have to have programming up there; a classic example of the chicken and the egg. The hardware could be here today, or tomorrow at the latest. But nobody is going to invest in heavy tooling for hardware if there is no big market and lots of programming to go along.

"We feel the ultimate opportunity offered by 12 gigs is tremendous for everybody in this industry. There is no reason to be afraid of 12 gigs. So many people are saying "Make your money now - 12 gigs is going to kill all of this". That's wrong. I'll bet you even have people telling you "don't put stuff about 12 gigs in **CSD**". 12 gigs is going to be good. It will be a mass market. People think that because it will sell so cheaply that they won't make anything on it. But they will. Everyone of those installations has to be put in by somebody. All of that equipment has to be distributed and warehoused. There will be a vast service network. And the more service oriented a new industry is, the better the business opportunities. I think the people in on the ground floor of 4 gigs are going to have a real advantage when 12 gig comes. There will even be an opportunity to step



AMPLICA President (left) and Fedric review the TVRO antenna parking lot at Anaheim. NM receives 1,000 LNA units per month from Amplica.

play with the equipment; not sell it. **Entrepreneur Magazine** has been very good for us lately. It really helped the growth of our distributor program."

I agree that is a good medium, Dave. I wrote an article for them back in the summer of 1980. It ran just ahead of the Houston SBOC Show and it drew in hundreds of people who wanted to study the business potential of this industry.

"Video magazines, the ones read by the dealers in video gear, have also been very good for us. Video people already have a business interest in a similar field, or they are looking for an investment opportunity. They don't care how the first stage of the LNA works; they are not out shopping for free equipment design

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JAN/FEB 1982

1 WU WESTAR 3 [91°W]

Polarization: All Horizontal

- TR-8(2)** **HUGHES SPORTS NETWORK**—sports events feeds [5 26 28]
- TR-9(3)** **OCCASIONAL TRANSMISSIONS**—sports events, news & news coverage [5 26 28]
- TR-3(5)** **XEW-TV, Mexico City**—Mexico's leading network station [6 2]
- TR-10(3)** **OCCASIONAL TRANSMISSIONS**—sports events, news & news coverage [5 26 28]
- TR-6(11)** **CSB Network International**—Webpage network feeds [5 26 28]
- TR-7(13)** **CB CABLE**—performing and cultural arts programming [5 8 mp stereo] 8
- TR-7(13)** **ROBERT WOOD COMMUNICATIONS**—occasional transmissions, sports events, news & news coverage [5 26 28]
- TR-10(3)** **RELIVE TV**—live first-run movies, concert specials, & sporting events [5 26 28]
- TR-8(15)** **FINN** [Financial Network News]—financial-business news with stock market readings [6 28]
- TR-8(15)** **SIN** [Spanish International Network] [5 26 28]
- TR-9(17)** **ESPN** [Sports Illustrated]
- TR-10(15)** **ABC Network**
- TR-11(21)** **CNN** [Cable News Network]
- TR-12(23)** **OCCASIONAL TRANSMISSIONS**
- TR-12(23)** **EWTV** [Entertainment Weekly]
- TR-12(23)** **STUDIO 90**
- TR-12(23)** **EROS**—adult
- SATELLITE CHANNEL CHART**

ATT/GTE COMSTA

- Numbers appearing in parentheses indicate actual direct satellites. Numbers in parentheses immediately following the service name indicate the number of particular service.

SATELLITE CHANNEL CHART

JAN/FEB 1982

WU WESTAR 1(99°)

Polarization: All Horizontal

- | | |
|-----------|--|
| TR-1(1) | OCCASIONAL TRANSMISSIONS —sporting events, news and network feeds [6.2/6.8] |
| TR-3(5) | OCCASIONAL TRANSMISSIONS —sporting events, news and network feeds [6.2/6.8] |
| TR-3(8) | OCCASIONAL TRANSMISSIONS —sporting events, news and network feeds [6.2/6.8] |
| TR-6(11) | OCCASIONAL TRANSMISSIONS —sporting events, news and network feeds [6.2] |
| TR-6(15) | PBS (Public Broadcasting)—schedule A programming [6.8] |
| TR-9(17) | PBS (Public Broadcasting)—schedule B programming [6.8] |
| TR-11(21) | PBS (Public Broadcasting)—schedule C programming [6.8] |
| TR-12(23) | PBS (Public Broadcasting)—schedule D programming [6.8] |
| | PBS OCCASIONAL FEEDS [6.8] |

ATT/GTE COMSTAR

- | | |
|------------|--------------|
| TR-1W(1) | OCCASIONA |
| | (5.86 2.6 8) |
| TR-11W(2) | OCCASIONA |
| | (5.86 2.6 8) |
| TR-2V(3) | OCCASIONA |
| | (5.86 2.6 8) |
| TR-2W(4) | OCCASIONA |
| | (5.86 2.6 8) |
| TR-3H(6) | BRAVO-26 |
| TR-4V(7) | NCN |
| | ESCAPADE |
| | THE PLAYE |
| TR-5V(8) | OCCASIONA |
| | (5.86 2.6 8) |
| TR-5H(10) | OCCASIONA |
| | (5.86 2.6 8) |
| TR-8H(12) | OCCASIONA |
| | (5.86 2.6 8) |
| TR-7H(14) | OCCASIONA |
| | (5.86 2.6 8) |
| TR-8V(15) | OCCASIONA |
| | (6.26 8) |
| TR-9V(17) | TR1 Thrill |
| TR-9H(18) | HOME BOX |
| | OCCASIONA |
| TR-10V(18) | AMERICAN |
| TR-10H(20) | OCCASIONA |
| | (5.86 2.6 8) |
| TR-11V(21) | OCCASIONA |
| | (5.86 2.6 8) |
| TR-11H(22) | OCCASIONA |
| | (5.86 2.6 8) |
| TR-12H(24) | OCCASIONA |
| | (5.86 2.6 8) |
| TR-7 | |

SATELLITE CHANNEL CHART

JAN/FEB 1983

- 5 Audio Services on SATCOM 1**
- TR-2 SATELLITE RADIO NETWORK** (6 2)
- TR-3 SATELLITE MUSIC NETWORK**—Popular music (5 58/5 76 stereo)
- SATELLITE MUSIC NETWORK**—Country music (5 94/6 12 stereo)
- WFMT (FM)**, Chicago (6 3/6 48 stereo)
- Bonneville's "BEAUTIFUL MUSIC" (7 38/7 56 stereo)
- Seeburg's "LIFESTYLE" Music (7 69/5)
- TR-6 MOODY BIBLE INSTITUTE RADIO** (5 58/5 76 stereo)
- TR-8 CONTINENTAL BROADCASTING** (6 3/6 48 stereo)

ATT/GTE COMSTAR 4 (127°W)

Polarization: 000—Vertical
EVEN—Horizontal

- NO VIDEO
- WU WESTAR 2** {123}
- TR—2{3} OCCASIONAL
INDEPENDENT
- RCA SATCOM 2** {11}
- TR—8 ROBERT WOI
work feeds [6
TR—9 AMERICAN P
[6 B]
TR—11 LEARN/ALAS
TR—13 NASA CONTR
TR—18 OCCASIONAL
TR—23 ALASKA SAT

ANIK 2/3 (Canadian)

- TR—1(1)
TR—3(5)
TR—4(7)
TR—8(15)
TR—10(19)
TR—12(23)

ANIK B (Canadian)

- | | |
|-----------|---------------|
| TR-4(7) | OCCASIONAL |
| TR-6(11) | CBC NORTH- |
| TR-7(13) | OCCASIONAL |
| TR-8(15) | CBC (French C |
| TR-9(17) | CBC OCCASIO |
| TR-10(19) | CBC NORTH- |

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JAN/FEB 1982

Issued 1-1-82

- | | | | | |
|---------------|---|---|--------------|----------|
| RCA SATCOM 3R | [131°W] | 6 | Polarization | DISH VOR |
| TR-1 | NICKELODEON —premium children's programming (6 B) | | | |
| TR-2 | ARTS (Aqua Television Television Service)—performing and cultural arts programming (6 B) | | | |
| TR-3 | PTL (Thee Low)—religious (6 B) | | | |
| TR-4 | WORK (Thee Work)—advice, self-improvement, status (6 B) | | | |
| TR-5 | SPOTLIGHT —first-run movies, concert & entertainment specials (6 2/6 B) | | | |
| TR-6 | THE MOVIE CHANNEL —24-hour first-run movies (3 B & 6 & 6 stereo) | | | |
| TR-7 | WTBS , Atlanta—Ted Turner's Superstation (6 B) | | | |
| TR-8 | ESPN (ESPN Channel & Sports Network)—24-hour sports (6 B) | | | |
| TR-9 | CNN (Christian Broadcasting Network)—religious (6 B) | | | |
| TR-9 | C-SPAN —live coverage from the House of Representatives (6 B) | | | |
| | SHOWTIME —professional sporting events, College and the English Channel (6 B) | | | |
| | REIT (Real Entertainment Television)—reality (6 B) | | | |
| TR-10 | USA NETWORK (West)—first-run movies, entertainment specials (6 B) | | | |
| TR-11 | MTV (Music Television)—Pop/Rock video (6 B & 6 & 6 stereo) | | | |
| TR-12 | SHOWTIME (East)—first-run movies, entertainment specials (6 B) | | | |
| TR-13 | HBO (Home Box Office)—first-run movies, sports & entertainment specials (6 B) | | | |
| TR-14 | CNN (Cable News Network)—24-hour news (6 B) | | | |
| TR-15 | CNN B (Cable News Network second service)—CNN headline news (6 B) | | | |
| TR-16 | SHOWTIME (Sports)—occasional network remote and sports events feeds (6 B) | | | |
| TR-17 | KETV (American Educational Television)—educational (6 B) | | | |
| TR-18 | CNN (Christian Media Network)—religious (6 B) | | | |
| TR-19 | NJT (National Jewish Television)—religious (6 B) | | | |
| | GOOD STUFF —premium children's programming (6 B) | | | |
| | WOR-TV , New York—the Big Apple's top independent station (6 B) | | | |
| | REUTERS (Cable Health Network)—(est. Spring 1992) | | | |
| TR-18 | REUTERS (Health Network)—commodity-stock market information (digital video) | | | |

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buyers up from their 4 gig systems to a second system; at 12.

"The bottom line is that because of the economics of the hardware, 12 gigs is going to make a lot of changes in our marketing and the market we serve. The low initial price will bring hundreds of thousands of people into the marketplace. And, after they have seen what it is all about, many of these people will then move down to 4 gig systems because of the more plentiful services available. I see 12 gigs as good for the industry. It can't hurt ... it can only help!"

Well, long before we get to 12 gigs we have to get through 1982. What frightens National Microtech about 1982? Where are the dangers?

"Legislation. That's it. The movie industry has enormous political power. I think this has got to concern us all. That influence reaches all of the way to the White House.

"I don't like the attitude of some of the suppliers that they won't support SPACE because they think Rick Brown is apt to make some money out of their support. Heck, Rick Brown deserves to make some money out of it! If he can save us from this legislation, or FCC regulation, or a massive negative court decision, he deserves to make money for his talent and efforts. He is not some public interest attorney that works for free. He is just as entitled to make a profit for his time as I am for mine, or you are for yours. More important, he is doing the one thing that will benefit every single one of us. With the possible exception of you, Bob, he is the only one in this industry that is doing things for all of us as a group.

"This is an important period in our growth. These are among the most powerful people in the world. Their power is greater than kings and presidents, because it can be manipulated in subtle ways world wide. They can sweep us away before we know what hit us. It is just that simple."

What, after legislation, concerns you about 1982?

"I hope the FCC doesn't take a close, hard look at receiver radiation. That could be a problem".

OK, problems aside, what is the biggest thing we need as an industry?

"No question about that one; we need to have our product accepted as security for consumer loans. The finance companies and banks have got to be taught what this product is, why it has value, and why it should be good as collateral for a bank or finance company loan. It should be just as good as a television set or a car."

How do we get there, to consumer financing?

"One thing I think we need to be doing, as individual companies, is to use the business media for advertising. We need to be telling our story to financial people. We are already starting that on our own.

"Another thing we should be doing is bringing established business people into our business, as distributors and dealers. They already have a line of bank credit and the banker knows them for their expertise. If they get involved with us, they will do the education job on their local bankers. I think we may see the retail package pricing on terminals dropping under \$3,000, for an installed terminal, before the end of 1982. This will be for a simple but effective system. Now at that price level, the terminal fits right in there with dozens or hundreds of other bankable sales.

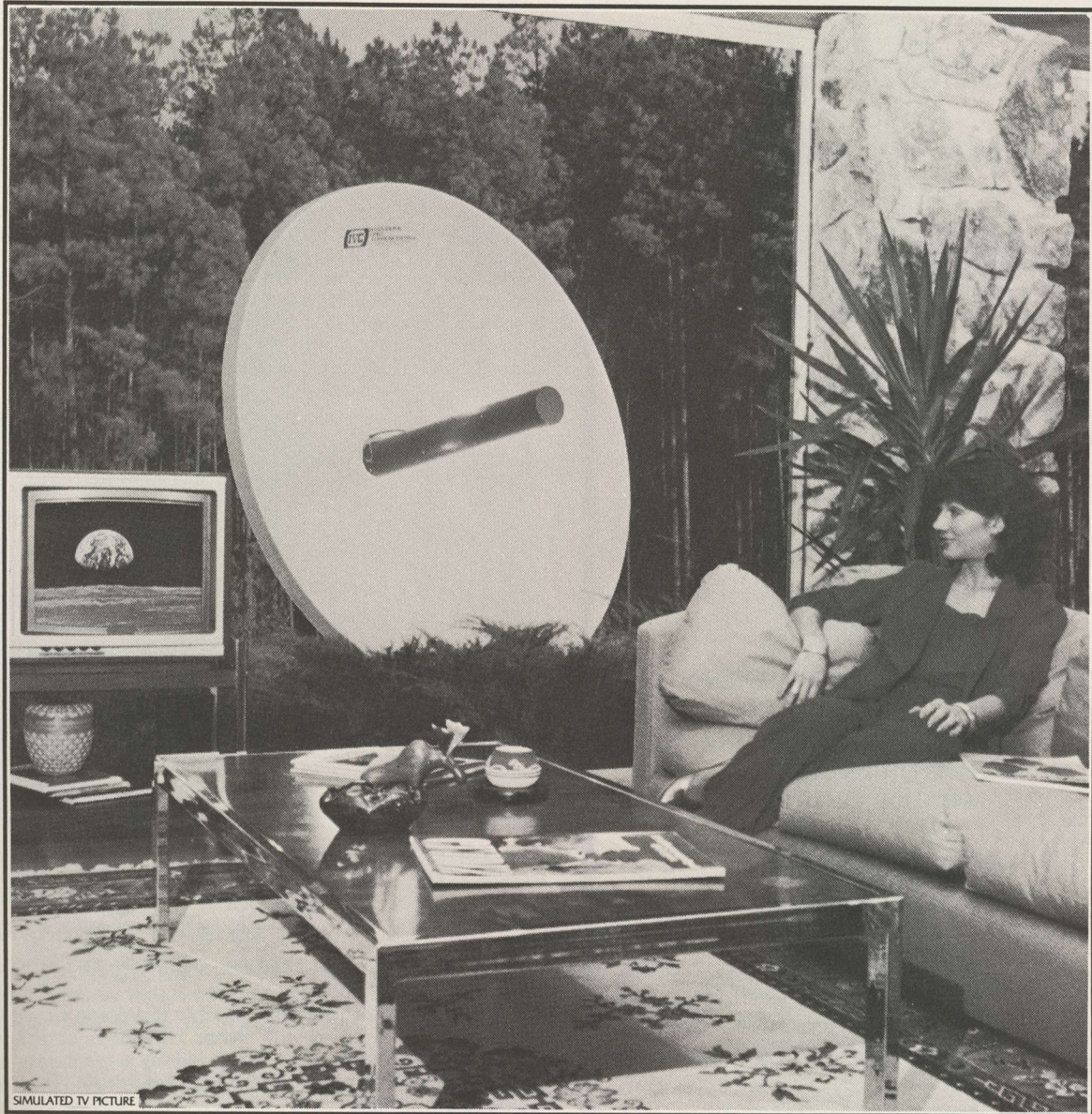
"We will be doing our part in 1982. Horton has already been to some banking seminars explaining what a terminal is, how it works, and why it has value. Once the financial institutions understand what it is, and they see the prices level off, then we'll see a maturing of the attitudes towards consumer financing. We'll know when we are there; that will be when the bank accepts the terminal as security for the loan.

"I'll tell you how important we think this is. We have a budget of nearly \$300,000 for just four full page advertisements in a national publication during 1982. We want people to know our industry story, and we are doing our part to get it told!"

You people have done so well in just over a year of operation. Here I am talking with you as not only our industry "Man Of The Year", but obviously as a man who has many valued opinions. You carry your growth well, I don't think it has gone to your head.

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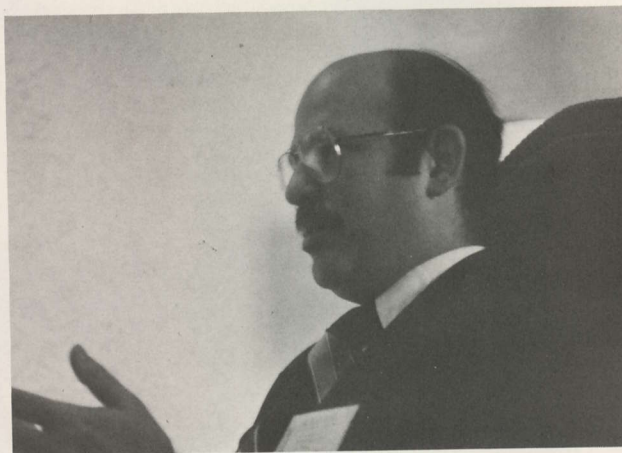
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Can you comment on some of the other approaches to distribution, and whether they bother you?

"From my viewpoint, people like Channel Master are healthy for the industry. CM uses almost exactly the same type of distribution we have grown into. They established their system some years ago using home electronic parts for their basic product mix. You don't see them showing up at shows, such as SPTS, because they already have their distribution chain established, and for now at least I judge them to have all of the sales they can handle. All they have to do when they have a new product line such as TVROs, is call their existing distributors and ask "How many do you want?". That's a great situation, and one we are building towards as our own distribution network grows, and as we look down the road to 1982 and 1983 products.

"At the opposite end of the spectrum, I am greatly bothered by firms getting into this business because they think there is a fast buck to be made here. Several of the recent entrants are grasping for a new, fast moving product to pull them out of some corporate disaster. They start off by trying to "buy" a market share; at any price. Their introductory low prices send ripples through the industry. As Rick Brown said, on your SVS morning television program in Anaheim, nobody likes competition. That's true to some extent, although competition is healthy for all of us. What everybody likes even less than competition is un-



RICHARD L. (Rick) BROWN, VP and General Counsel of SPACE
"deserves to make a profit for his time" according to Fedric.

fair competition that doesn't play by the same rules as you play by.

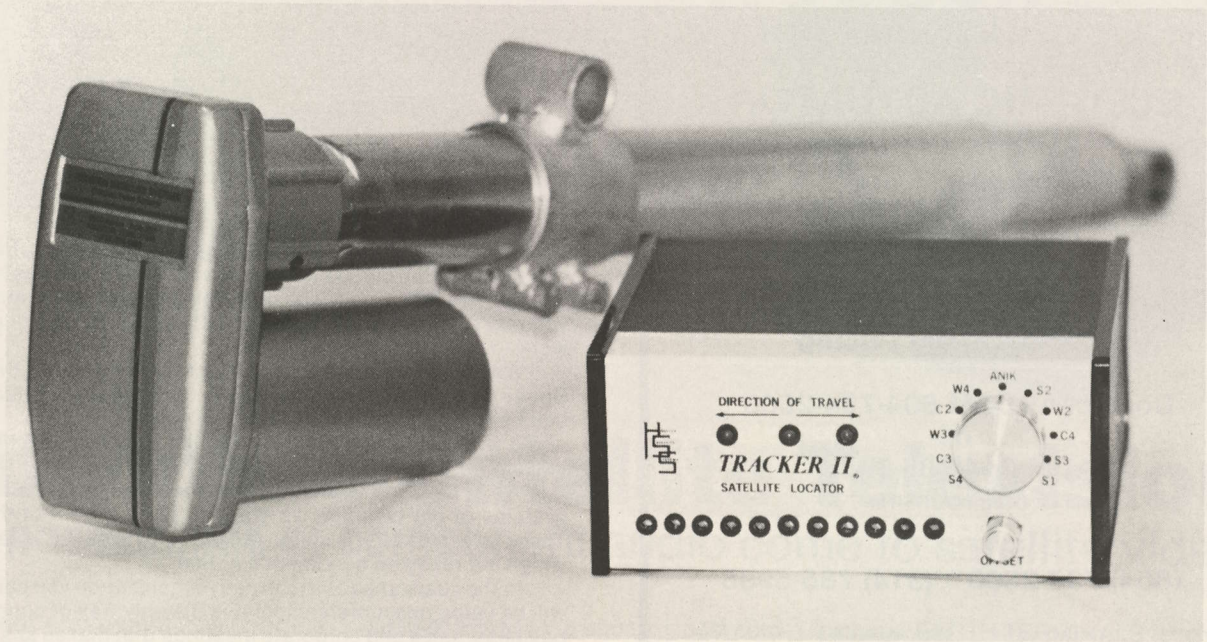
"This hurts the whole industry because it depresses sales or shifts the sales, temporarily, to a new supply source. Then when the supply source goes belly up, there is a brand new ripple in the industry to contend with. When somebody comes in and sells under the market price, there is only a temporary advantage for the new company. There is a long term set back for the industry as a whole.

"We have seen a lot of good industries destroyed or severely set back because firms come in willing to "buy a market share at any price". This forces manufacturers to operate with thin profit margins, or no profit margins. When this happens, you start to lose key suppliers. This industry has grown so far and fast primarily because we have had good companies in here that were willing to stand behind their products. When you start chipping away, unfairly, at chunks of the manufacturer's profit schedule, you force him to cut quality, or service, or both. Or worse yet, he will leave the market altogether, leaving a lot of equipment with no service center available.

"You know, when we had the slowdown this past spring, we saw several firms go belly up. They left the marketplace. When you take a product to market, you have to be smart enough to figure out exactly what it is costing you to get to market. Raw parts costs and direct labor is not enough. There is marketing

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overhead, general overhead, service after the sale ... it goes on for quite a ways. Sometimes the cost of the raw materials, and the direct labor, is the smallest part of the total "real cost" .

What about the trend to lower and lower prices? Does this worry you?

"Price erosion will end someplace close to the end of 1982. They will level off, although we may see some under \$3,000 installed retail prices by then. It is starting to get to the point where you can't squeeze the manufacturer anymore, without cutting into the product quality and the after sale service."

Is the teleconferencing deal you pioneered for your distributors, through Netcom, doing alright? Are you satisfied with the progress to date?

"No, I have been disappointed. The months of August and September were fairly busy. But it has never kicked off like we thought it would. There have simply not been enough jobs, not enough work."

"Now a few of our distributors get a fair amount of work in this field. But the company we work with in this area has in many ways been a little unfair. They play favorites too often, and while you can't blame them, it cuts a lot of our people out of getting work."

"We have to have a contract which we feel we can live with. But as long as we have an existing contract with Netcom, we can't and won't work with another company."

So what is the answer? It is not like you to stand still while you are unhappy with something!

"We'll package it ourselves. We are already putting in systems of our own and we are going to put a lot of them in. These are stationary units, at carefully selected premises, which are ready on a moment's notice."

"In the years ahead virtually any organization you can name will be using teleconferencing. It is the only way of conducting business, sales and corporate meetings that makes any sense. And they could go any of three ways. The user can buy their own downlink, or, they can rent a stationary system that is already in place and available for rent, or, they can use transportable downlinks brought to their location. We'll be viable and competitive in all three areas. I think the best thing for us to be doing right now is to carefully select sites and put in stationary downlinks. Then they will be available for rental when needed."

Sort of like a community approach? I wrote an article back in 1978 outlining the growth of teleconferencing I foresaw, and I came to the conclusion that one very tempting location is the local library. Most of the libraries are municipally run, they are always short of funds, and they are a natural place for people to gather for knowledge exchange. I can see a marriage here; it made sense in 1978, it makes even more sense now.

"That's a good one. College campuses are good also. And so are community centers. What we want to do is put in systems and rent them out to teleconference brokers. If you put in 200 terminals, at stationary positions, one in each of the 200 largest marketing centers in the country, and then offered any combination of these sites for a fee that would include a meeting room, a complete terminal, and an operator ... then you have a viable package. The local distributor or dealer runs the system when it needs to be run, provides backup equipment, and maintains the system."

"In the teleconferencing area, some of the deals coming to us for bid are mind boggling. We had one not long ago, that fell through for us, that would have required more than 1,000 of our sixteen foot systems. Could we have handled it? You bet! It fell through at the end, but this is just the tip of the iceberg. There are going to be many-many more of these large terminal buys in the years ahead. Teleconferencing is going to be very big business."

"Some people think I am really reaching to suggest that our small terminal industry can handle this type of package. I don't think we are reaching at all. For teleconferencing to work it is going to have to be cost effective. We were talking about \$4,000 terminals in the case cited; can you imagine Scientific Atlanta bidding \$4,000 for a complete 16 foot terminal? They would

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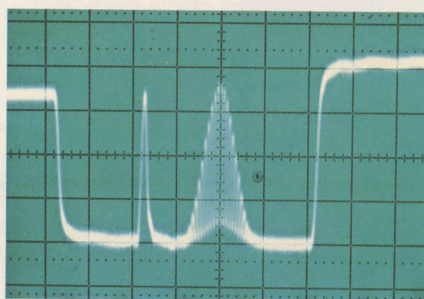
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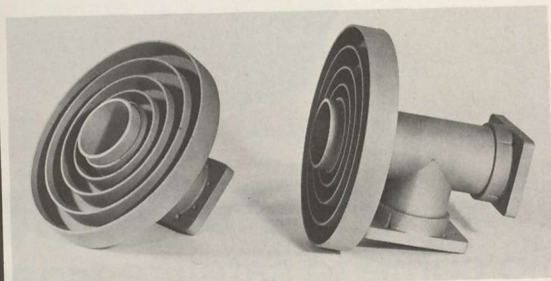
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Twelve months?

"Perhaps just six!"

Any parting words, Dave?

"You know, this industry has been good to a lot of us. From our original investment of \$2,000 each, we've built quite an organization in 18 months or so. Here we are doing nearly \$30,000,000 a year and straining at the seams with additional growth. It has been good to Tay Howard, to you and to a lot of other people. It can continue ... if ..."

If we can keep the legislative away and clear up the question of viewing rights once and for all?

"Precisely. I don't think the industry realizes how powerful the backers of the Waxman bill are. They are powerful, powerful people. And they play for keeps. They know all of the tricks and they are sophisticated people. We've been insignificant to them in the past."

David, your kind of volume, your very growth has changed that. There is no going backwards now.

"I know. That's part of the reason why we feel an obligation to support SPACE, and the industry, in this fight. I know they know how big we have grown, and what our rate of growth is likely to be in 1982. You know, HBO sent me a letter just over a year ago. It told me to stop selling equipment capable of receiving their signals ... or else. It made me so mad! Here they were threatening me, and National Microtech. I wanted to write them back a letter that would have had to be mailed in an asbestos envelope. But Rick Brown talked me out of it, and he was right. We just had to bite our tongue and cool it until the forum was right. Now it is. This is our opportunity to settle this matter once and for all."

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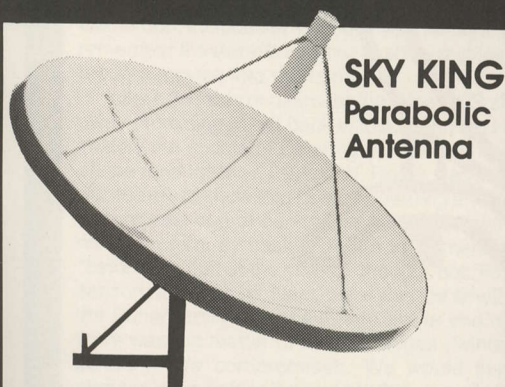
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If the following reads a bit like a travelogue, there is good reason. I have just stepped on board my U.T.A. flight to Paris to begin the 24 hour journey back to Miami International, from the Republic of Cameroon, on the coast of Africa. Yes, I too had to look it up on a map before I knew where I was going!

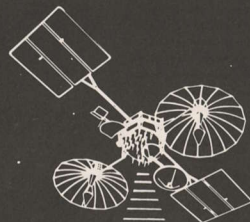
It was beyond my comprehension that there was, in this world, a nation of more than 8.5 million souls where television has never been before. I figured that even in the most outback of nations they had some form of television by now. When I would later learn of the bustling economy (fueled by an abundance of oil) and the French

Arunta State-of-the-Art

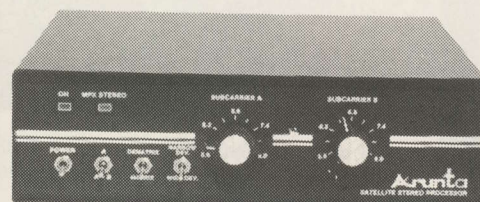


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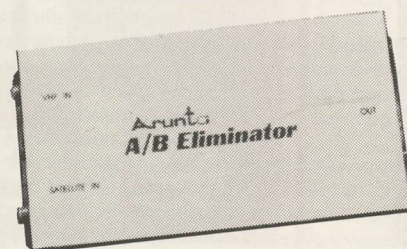
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heritage of the area, the total lack of television broadcasting would seem even more unusual to me. But I am getting way ahead of my story.

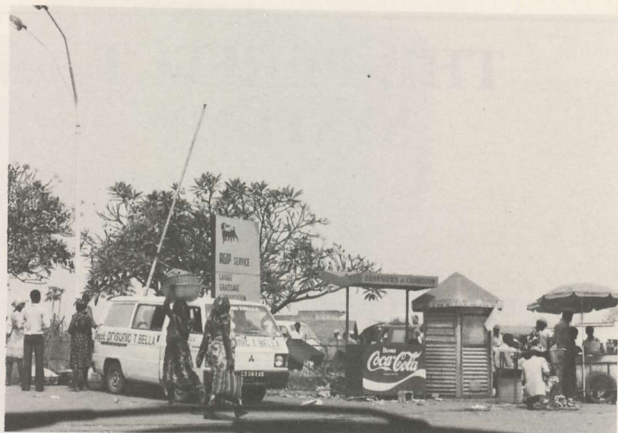
All of this began back in June of 1981, when Mr. Roger Fotso approached the Hero Communications booth at the Chicago CES gathering. He asked the usual questions and we explained what satellite television is, how it works, and what it might cost to have it in Cameroon. The Fotso family has many, varied, business interests in Cameroon. Included in that business-family is a chain of theaters. You remember theaters; they used to show movies there before television brought movies into the home!

Like hundreds of others at the June CES show, Roger Fotso went away promising to get back in touch with us. He did not; until approximately the middle of December. This time our contact was via telephone (and Intelsat, I suspect). Roger was in Duala, in Africa, and he wanted me to know that he was boarding an airplane to come to Miami to purchase one of our systems. He also wanted to know whether I would, in turn, fly back with him to Cameroon to put the system in "before the first of the year." I thought not. First of all, the Christmas season was upon us. Next, there was the small matter of a new child in the Behar family, expected right at the end of the year. And finally, there was the matter of the Las Vegas ('winter') CES show, in early January. We compromised. We would ship the system ASAP, perhaps even before the end of 1981. I would follow, as soon after the Vegas CES show as was practical.

The equipment chosen for this experiment was one of our six meter Hero Super Tennas, fully motorized and equipped with our new digital microprocessor dish control system, plus a Dixel 85 degree LNA, a backup Avantek 120 degree LNA, a special AVCOM receiver assembled by Andy Hatfield personally, a backup ICM4400 receiver, a Chaparral Super Feed plus a Taylor Howard circular polarization modification kit and the usual complement of cables and parts. Also in the shipping pile would be a new Drake receiver which Roger Fotso had seen, and liked in Las Vegas.

The decision was made to ship all of this, including the antenna, via air freight. The air freight tab turned out to be a hefty \$14,000; you don't ship 20 foot dishes a third of the way around the world inexpensively! Now before you figure nobody can want television 'that badly,' allow me to note we then did some refiguring on what we needed, and did not need, in Cameroon. The base, for example, was 'suspect' since it is a huge segment of carefully fabricated steel. And a major portion of the weight of the shipment. We determined that if we left the base in Miami, and Roger was to build one in Cameroon, the air freight bill could be shaved to a 'mere' \$4,000. Yes, that still sounds like a bunch of dollars. However, it would later turn out that the air fare to get me to Cameroon was \$2,100; so the \$4,000 air freight bill was not so bad after all. If I occupied one seat, there is no way we could have gotten everything else going into two more seats! And so the shipment, less the big, heavy, steel mount, left Miami headed for Paris and eventually Cameroon. When they finally arrived in Duala, they would have traveled 11,241 miles. Nearly half way around the world, as the air freight plane flies.

With Roger and the freight headed for Cameroon, my next task was to tend to business and await a telephone call. On January 20th our new baby daughter arrived, and a week after that Roger called to report all of the air freight was in Duala. A schedule was drawn with me leaving Miami in February 3rd, and arriving in Duala at 8 PM local time in February 4th. I asked Roger what travel papers, other than the usual passport were required. Roger's response rang in my ears later. "Don't worry about it; just get here and we'll take care of it on this end". Well, I am enough of a traveler to know that one often needs a visa, some special shots, and so on to head into uncharted territory. But with Roger's assurances still fresh in mind, I blindly used the 24 hours remaining to tidy up the operation of Hero. The first problem came up while I was still in Miami; Pan Am was not eager to check me in without a set of papers that would get me to Cameroon. I didn't have the



TYPICAL TOURIST — picture. The 'friendly' sign if Coca-Cola seems to be world wide!

required visa, or, had I been advised to obtain several (Cameroon) required 'shots.' Although I was ticketed all the way to Cameroon, Pan Am finally agreed to allow me to fly with them to Paris; the first leg. I had several hours to plan how I was going to get past the same obstacle at Air Cameroon.

This hurdle proved easier to solve than I anticipated. First I checked in my baggage and then purposefully waited in front of Air Cameroon until close to the last possible moment. Immediately their red flags went up; **no visa, no immunization papers, no boarding.** But with the flight due to depart, they finally decided it would be better to let me on board (thereby shifting the problem to the Cameroon end), then to hold up the plane searching out my baggage!

I was confident that when I stepped off the Air Cameroon plane Roger Fotso would be there to greet me, and, to help me through Cameroon authorities. —Wrong again. After some 24 hours of traveling, jet lag and arriving in a country where the language is French and I speak only Spanish and English, I worked my way to the back of the line hoping that before the line reached to my point Roger would show up. Nearly two hours later I was alone in the waiting area and several armed, uniformed Cameroon personnel were converging on me. I now knew the meaning of the word 'alone'.

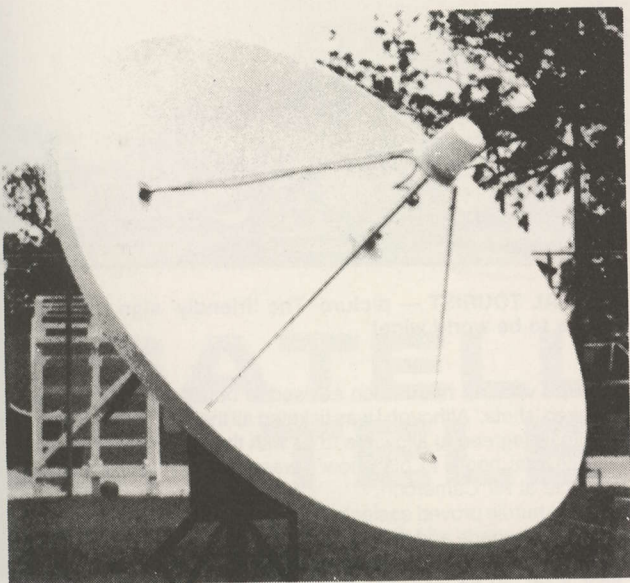
Just as they reached me I looked up to see someone on the 'good side' of the partitioned room appear with my name hand printed on a card. I pointed at the card, and to me, and one of the uniformed chaps went to investigate. When he came back, I got the impression that while I was not off the hook, they were not going to reel in my line just yet. Later I learned that Roger Fotso had been delayed on his trip to pick me up, and if I would just 'sit tight', he would be there. Eventually he did appear, and it took him about two minutes of earnest discussion, privately, with the immigration and customs people to get me out of the lonely part of the room, and into the friendly part. As in every country I have ever traveled to, a few words spoken by the right person, to the right people, usually works everything out. And so we were off to Yaounde, our final destination, and some 250 miles from Duala. It was past midnight when we arrived, and someone mentioned that the TVRO system hardware was at that moment on a train bound for Yaounde. I has last slept 36 hours before, so the logical thing to do seemed to be to get some sleep, at my hotel.

Late that morning we inspected the site where the antenna system was to be installed. I had been in some tough spots before; this one looked like the roof of a commercial installation we did for a television station in Detroit. Only the insipid heat, the intense tropical vegetation and the frequent reminders that we were in a newly emerging African nation kept me sure I was not somehow in Detroit!

Atop the three story building, we had to somehow anchor the dish. The roof was a concrete slab, and flat, so it looked like it would be do-able. First we had to chop a large hole in the roof to set in a new sub-foundation with steel rebar rods, and a set of very long bolts to eventually attach to the steel antenna base. With that effort underway, we went to a local welding shop to inspect the base which was being

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fabricated there to our specifications. A French man worked the shop, and between a small amount of English he spoke, the occasional similarity between French and Spanish words, and lots of sign language, I got across my objections to the work already done, and, the work necessary to complete the mount. Since we had saved \$10,000 in air freight by electing to build the mount on site, there were several bucks involved in doing it right!

Then the bad news. The antenna, in shipment from Duali to Yaounde by train, did not arrive. The explanation was interesting; the last set of freight cars were left in Duali because somebody had forgotten to connect those cars to the train! If they have a caboose on Cameroon trains, the conductor was still sitting in the Duali yard as well!

With the base progressing, and the antenna stuck on a train siding, I took the balance of the day to go shopping for some heavy equipment. The first big problem in installation was going to be lifting the nearly thousand pound base from the ground to the top of the three story roof. That would require some winch equipment, heavy rope, a come-along and the usual assortment of U.S. hardware store items. They do not have discount hardware stores in Yaounde. They do not have what you and I would consider hardware stores in Yaounde. So you shop a piece at a time, traveling here and there and trying to get across through the language barrier what you need.

On Saturday we raised, very carefully, the big pedestal section of the base. It took (it seemed) about half the population of Yaounde. I aged ten years watching the heavy steel fabricated piece come up the wall, a notch at a time, slowly move over the edge, slip and fall back and then somehow miraculously catch and stay in place long enough for more manpower to get another 'bite' on the line tugging it upward. By 2 PM we were on the roof with the pedestal; and the antenna (on the train) was still not in town. We set up lights to work through the night as I had given my word we would have satellite television pictures by Sunday.

At 6 PM the contractor was finished with retrofitting the roof for the pad. 'On schedule', the antenna appeared and by 6:25 PM we were starting the assembly of the 20 foot dish. Roger had kept his entire staff on hand and there were eight of us all told. We were progressing quite well when at 10 PM I suddenly became very sick. The change in climate, the heavy travel schedule, the uncertain food. . . and water, had finally taken its toll. I scribbled out some instructions and then in a daze I was transported back to the hotel where I collapsed.

At 12 noon on Sunday I was able to move about again. Roger advised me that the crew had stopped work at midnight; they were just plain pooped. The dish was ready for the mesh surface and by 3:30 PM we were ready for the next big problem; lifting a 20 foot reflector surface, by hand, to the top of a 12 foot pedestal. Without destroying the dish, or injuring somebody.

Now I discovered the real language barrier. When you do something like this with an experienced crew, you do it very carefully, a part of an inch at a time, and somebody stands back far enough from the action to monitor progress and shout instructions. The first time I shouted an instruction and nobody responded, I knew we had problems!

I tried relaying the instructions through an interpreter. That didn't work. By the time he understood my strange instructions, got them translated into French, and repeated them aloud we were past the point where the instructions applied. It seemed hopeless until the Frenchman from the metal working shop offered to help. Since he was a very talented mechanical type person, and spoke some English, I sat down and patiently explained to him, step by step what had to be done, where the problems would occur, and what to do when they occurred. It took ten minutes of J'compre (I understand), and I turned him loose. Behind my back, I had all of my fingers crossed. I considered leaving the site and coming back after the disaster was over, but that seemed like a chicken thing to do. I didn't have to worry; in ten minutes time he had the crew move the dish from the roof to the top of the pedestal, and it was secured in position. Basic mechanical problems, it seems, have a universal solution and language should never get in the way of getting the job done. However, there were a few moments in that particular short span of my life that I prefer to forget, and which I hope never to repeat!

Well, with the antenna up the time had come to finally get the first

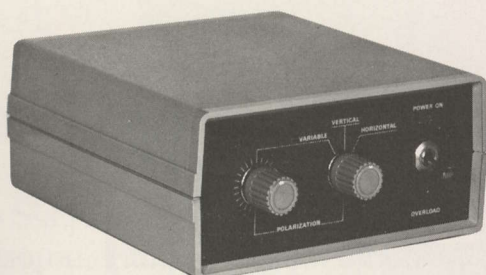
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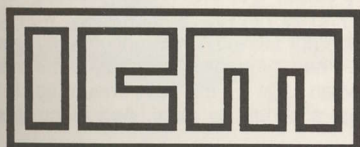
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"African Satellite Expedition" into high gear. After setting the polar mount angle, the correct declination angle, and the LNA feed horn at the proper focal point, we were ready to go 'exploring' for signals.

Roger Fotso, I should note, operates a very successful video shop. Yes, in a country where there is no television **broadcasting**, there is a fantastic trade in video equipment. And, of course, tapes. In the city of Yaounde there are at least six video shops, and the video gear on display is the most modern (often equipment not yet on sale in the states) in the world today. Roger hauled a four-standards TV monitor (PAL, SECAM, NTSC, and NTSC modified with the 4.43 sub-carrier color). And we were ready to go.

With a TV camera set up, to tape the effort, we were under the gun to perform. The crew had shown enthusiasm, but I understood their skepticism. It crossed my mind that it would not be too cool for me to



HIGH UP — the look (elevation) angles are nearly straight overhead in this part of Africa and then you put the dish atop a three story building!

get this far and then fail to produce television pictures. I was not too sure what might happen to me if television pictures didn't appear on the screen in a reasonable length of time, but I was sure it would not be pleasant.

I put the AVCOM receiver into scan mode and swung the dish through a full arc; horizon to horizon. There was no sign of anything. I repeated it a second time, and still nothing. This is the point where you start running a mental check list on the possible problems. Could the LNA be bad? A short in a cable? Was the AVCOM working? Was the monitor working properly? The 'natives', shall we say, were getting restless. Roger Fotso was not smiling. I was uncomfortably warm.

And then it hit me. I had overlooked cranking in the magnetic deviation at Yaounde when I set the polar mount up. It was 5 degrees, and it took just a minute to reset. And then, perspiring

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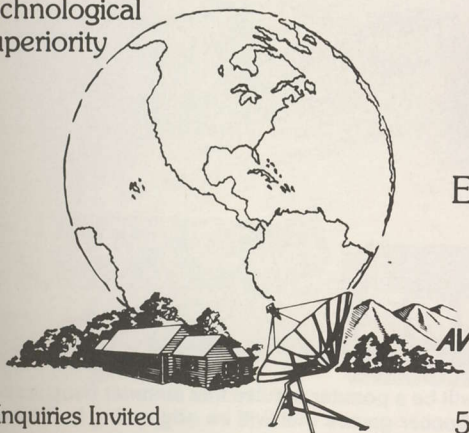
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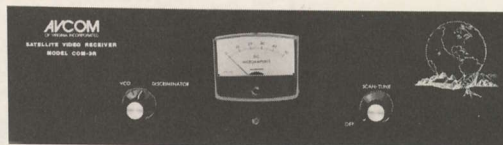
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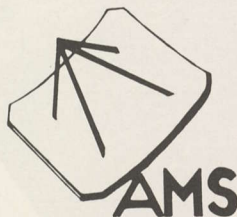
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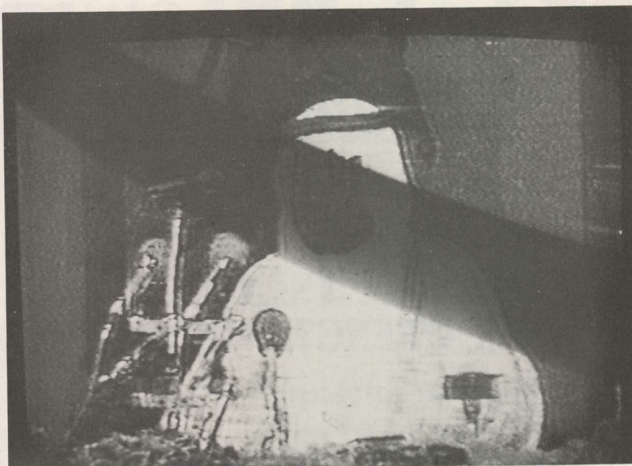
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NOT CENSORED — This Saudi Arabia transmission was totally out of the noise, but we were shooting at 1/30th of a second, out of 'American custom,' when we should have been shooting at 1/15th. Hence, the black diagonal 'focal plane shutter' bar.

profusely, I started the sweep again. The antenna was pointed almost overhead (remember we are nearly on the equator here!) when a signal flashed across the screen with the AVCOM in the scan mode. I glimpsed just enough to know that if I switched off the scan-tune mode, and rotated the channel selector to 9, that we would be watching Moscow. I did, and we were. This is the same shannel which one of the major US networks has been taping, in our Miami shop, for several months now, day in and day out. They have been doing this as a means of intercepting the occasional bit of Polish (crisis) news film footage and if you wonder where some of the US evening news Polish TV reception coverage has been coming from, well, it starts in Moscow but hits the USA in Hialeah. Only here in Cameroon, the signal is far stronger than in Miami. I looked at my watch, and 23 hours and 55 minutes had passed since we started assembly on the big dish. Although nobody (me included) understood the Russian announcer, there was great joy and jubilation three stories above the streets of Yaounde. One of the chaps who had been needling me in his tattered English about 'American efficiency' was leading the line of hand pumping well wishers. American technology prestige went up several notches when Russian television pictures appeared on this rooftop in western Africa.

It took me about five minutes to tire of Moscow television. I wanted to really go exploring now, certain we were in business. But first I had to convince everyone there that 'yes, we can bring the antenna back here' and 'no, we will not lose television service'.



TVE/Spain will be a popular service this summer because of the World Cup Soccer games that will be originating in Spain.

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5:30 P.M.

01 [A2/3] – MOVIE: 'Columbo: An Exercise in Fatality' Columbo suspects a physical fitness expert of killing his business partner. Peter Falk, Robert Conrad, Phil Bruns. 1974

06 [F3] – Week in Review

06 [D2] – MOVIE: 'A Simple Story'

07 [A2/3] – Wayne Thomas Show

08 [F3] – American Trail

11 [AB] – Disney's Wonderful World

11 [W3] – Rachmaninoff Piano Concerto #2

12 [F3] – Paul McCartney and Wings Rock Show A film of the Wings on a concert tour.

13 [F3] – MOVIE: 'This is Elvis' Actual footage and restaged scenes depict the life and career of Elvis Presley. 1981. Rated PG.

14 [F3] – Newsmaker Sunday

15 [F3] – News Update

15 [A2/3] – Super Cascade II

17 [F3] – It Is Written

17 [D2] – Father Manning

17 [W3] – Telefrance: U.S.A. Today's programs are 'Theater Gala: Piege Pour Un Homme Seul, TeleGazette' and 'In Performance: Coppelia, Act II.' (3 hrs.)

19 [A2/3] – Trapper John, M.D.

15 [W1] – Masterpiece Theatre – 'Remember Nelson "Love" Fanny. now 42, is still very much in love with her husband, despite long periods apart when Nelson was at sea and rumors of his affair with Lady Hamilton. When confronted with his relationship with Lady Hamilton, Nelson tells Fanny that he cannot give Emma up.

17 [W1] – Life on Earth "The Invasion of Land"

21 [W1] – Oye Willie "Golden Boy"

23 [W1] – NOVA "The Asteroid and the Dinosaur"

6:00 P.M.

07 [D2] – MOVIE: 'Beyond the Door II' A widow who has recently remarried returns to her home with her new husband and son and soon learns the old house is occupied by an evil presence. John Steiner, Daria Nicolodi, David Colin, Jr. Rated R.

07 [A2/3] – Trapper John, M.D.

11 [AB] – Beachcombers

11 [W3] – Strumpet City Part 1

13 [W3] – MOVIE: 'Mahogany' The rags-to-riches tale of a young black woman who rises from the depths of the ghetto to international fame as a fashion model. Diana Ross, Anthony Perkins, Billy Dee Williams. 1976.

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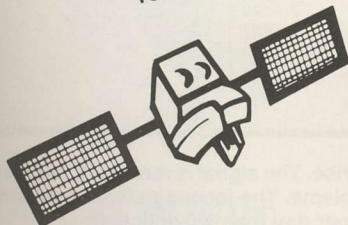
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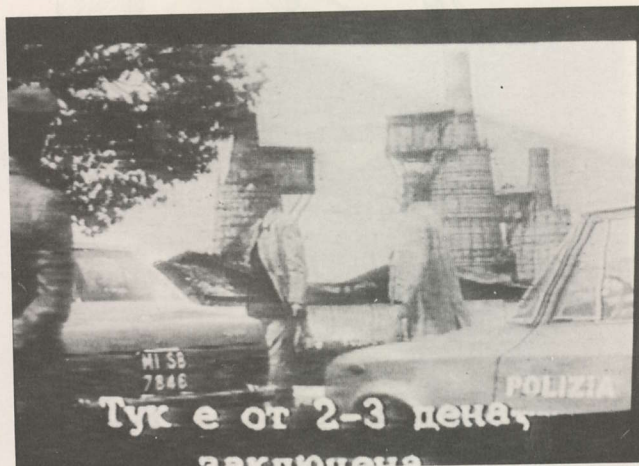
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MOSCOW seems to cover most of the world. Here the Ghorizont-2, feeds so familiar to us in Miami, are super strong in Africa.

I started west, from the 14 degree (nominal) west location of Ghorizont and about five degrees away I found a signal on transponder 24. There was something very strange about the picture I was seeing and I glanced at the monitor. It said we were (automatically) receiving NTSC 3.58 video. USA television!

But that was not the strange part that bothered me., I scrutinized the really quite decent picture wondering why it all looked so familiar. It was a slide of a beachfront, taken from just off shore. Condo's and buildings rose all along the beach front. Then a board man at the other end hit a switcher button and a super appeared over the slide. It read "Top Of The World" and "WPBT-2 Miami." — Good grief. No wonder the water front view looked familiar. It was Miami Beach, barely 2 miles from my own home! I cannot properly describe the feeling that came over me, sitting in Yaounde, Cameroon, some 11,000 airline miles from 'home' and seeing a television transmission that included a shot from a point only two miles from my Florida home. And strangest of all, here it was on Intelsat, over Africa, and heading who knows where. After the shock of that we moved further west and found the next Intelsat bird. Here I found a full transponder of Saudi Arabian television (virtually flawless reception, I might add), plus half transponder video services for Sudan, Zaire, and Niger. Here on one bird we had four countries represented and it later turned out that each used their transponder space for their full day's television schedule.

At this point we were all quite pleased with the results, although as the next day plus would indicate, the variety of television available on a 20 foot dish in Africa was far more expansive than this initial surge of activity. Primarily, I had not yet found Symphonie, the old French operated 4 GHz bird which I had seen from Barbados. Obviously, it would be nice to find a French speaking channel for these French



SYMPHONIE was a surprise. The signal is strong, or not there at all, because of bird problems. The language is French and the service is much longer per day than we anticipated.

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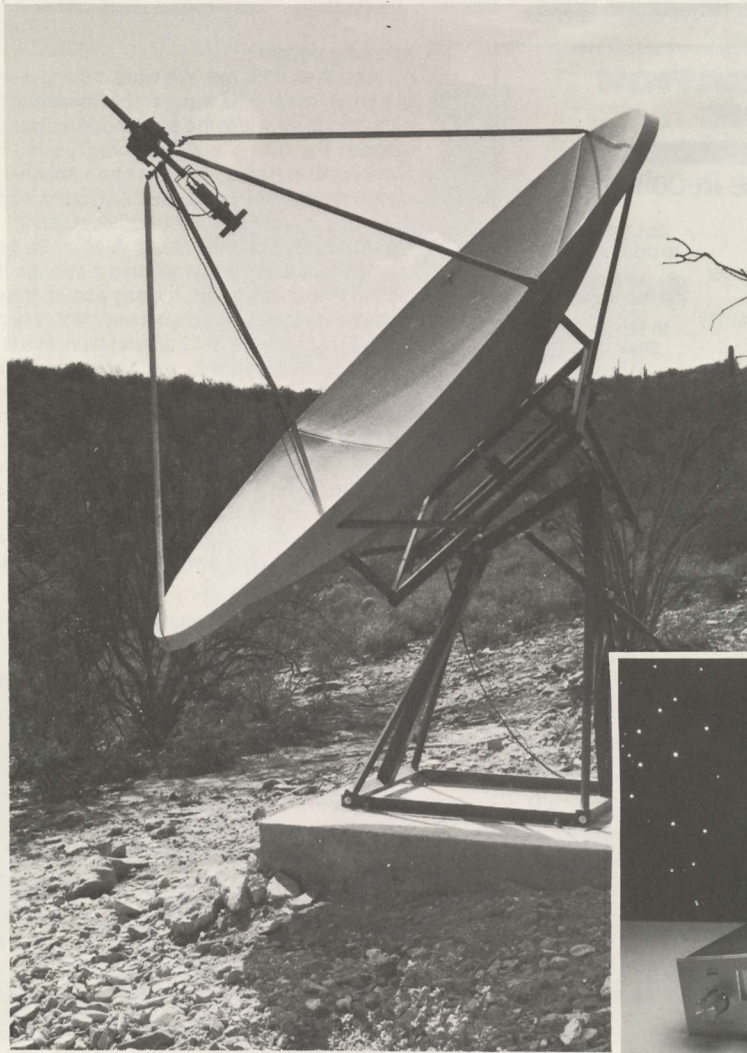
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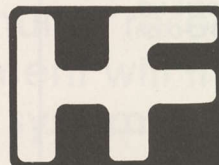
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speaking people.

And then it hit me. We were moving west with the antenna a bird at a time, Symphonie was east of Ghorizont. So the dish was run east, past Ghorizont and in the scan mode a picture flashed on the screen. I stopped the tuning and anchored us on 12; where I had logged Symphonie in Barbados. No picture. Manual tuning, and there it was, on transponder 24. In full (SECAM) color, perfect picture, full quieting, gorgeous color! Now we had full quieting, no sparklie pictures on Ghorizont, Symphonie, Saudi Arabia, Sudan and Spain. However, during the viewing of Symphonie a strange thing would happen. The picture would be perfect, way above threshold. Then in a second or less the picture would go away. Not only get weaker, but go away totally! This kind of 8 to 12 dB variation, in a short period of time, was a totally new experience for me. Later, upon checking, I would learn that the Symphonie 4 GHz bird is near or past its useful life and they are out or almost out of thruster control (fuel). The bird wanders, badly and on occasion rapidly. The bird actually wanders around quite a bit and I would later discover similar 'wanderings' on some of the Intelsat birds.

In past CSD articles describing the Intelsat system, we have read that the Intelsat station-keeping is 'loose', by US and Canadian bird standards. That is, Intelsat allows their birds to drift about as much as 2 degrees. They get away with this since all of the Intelsat receiving

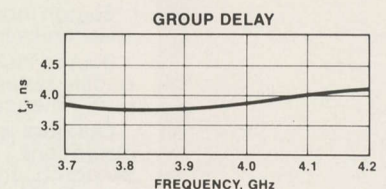
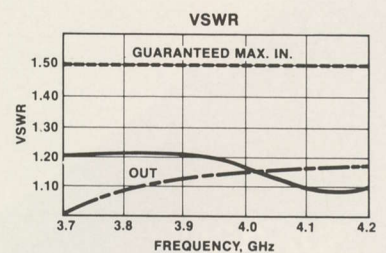
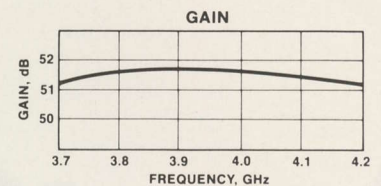
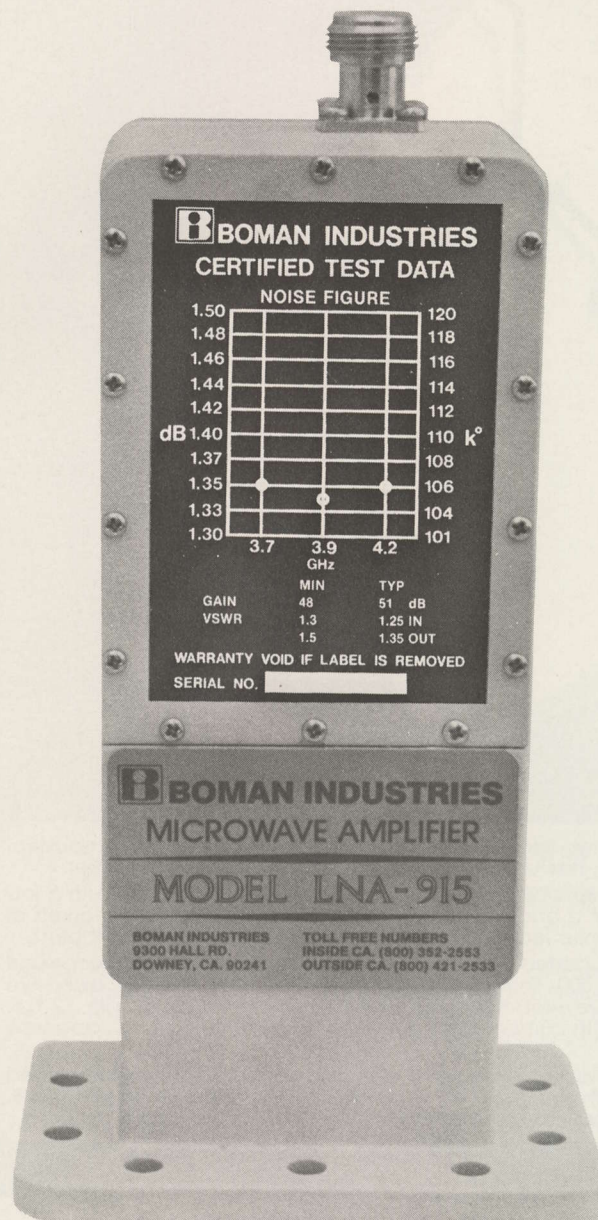
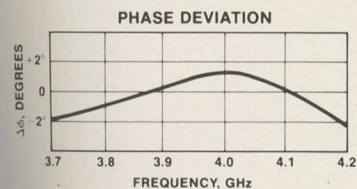
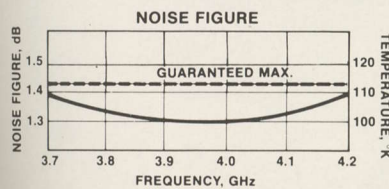
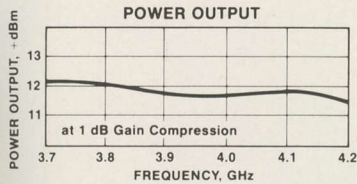


AT HOME ANYPLACE — a hastily assembled tent drapes over the equipment atop the three story theater building to shade the TV screen and the equipment operator. Yes, it does get VERY hot in this part of Africa!

terminals are motor driven, and they transmit bird correction headings for each bird to each affected ground station at least once per day. What I was not prepared for is that not only do the birds drift east and west along the equatorial belt line, they **also drift** north and south. This means that while a polar mount can track the east/west movements just fine, the north and south gyrations require some method of also tweaking on the elevation of the dish. The birds move in a roughly figure '8' pattern, crossing the equator three times in their '8 pattern.' At the extremes, north and south of the equator, our equatorial belt tracking mount is not going to find the birds.

On Monday morning we had another session of transponder looking. To my initial surprise, there is very little going on, anyplace, before 12 noon Camerron time. Camerron is 1 hour east of London, and therefore one hour later in the day. And at that point of the day, it is 6 AM on the east coast of the USA. So starting about noon local time there are news feeds for the CBS Morning News, and other news feeds for ABC. These are typically sent in a one-half transponder format, and on a 20 foot dish the pictures do have sparklies on a **standard** receiver. A 'special receiver' however is a whole different ballgame, as I'll note shortly. We spent Monday running the dish back and forth, logging and recording as many different signals as possible. The end result of all of this is that in Cameroon, on a standard TVRO receiver, a 20 foot dish and an 85 degree LNA, you have up to six perfect transponders representing Europe, Africa and Asia. Then you have up to another dozen or so which are either totally watchable and

CREDIBILITY

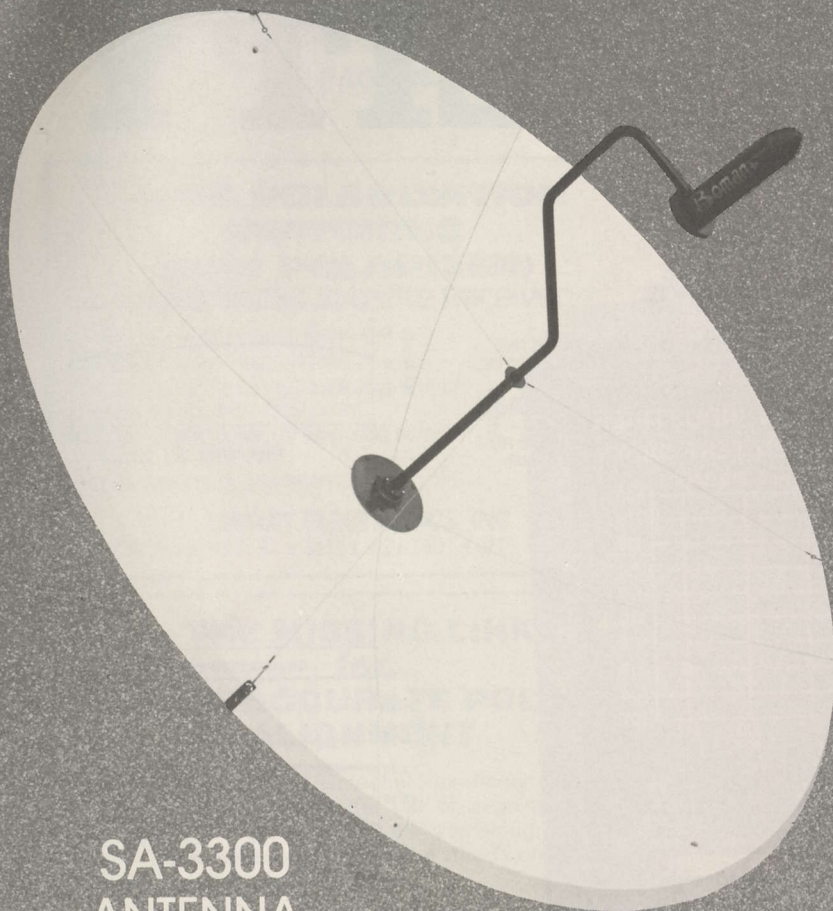


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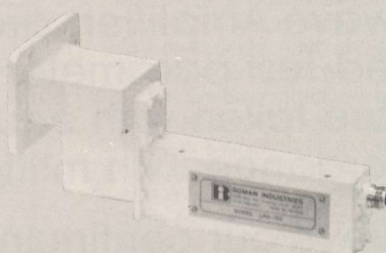
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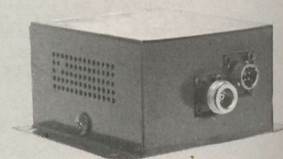


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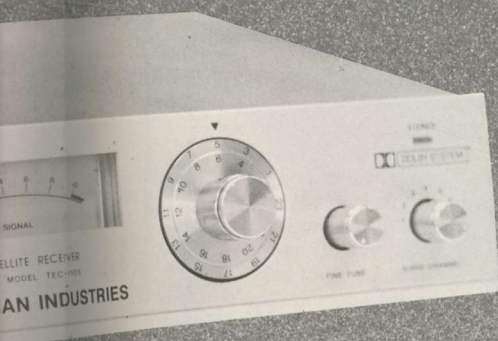


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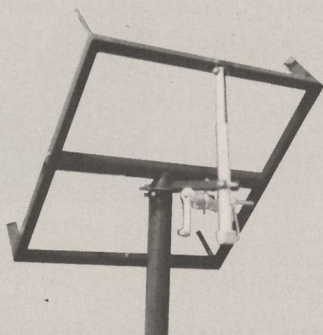
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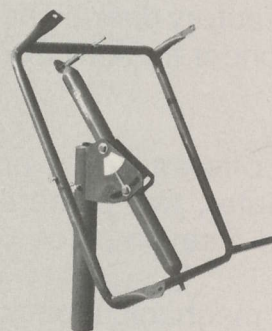
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useful, down to not worth watching. That evening Roger and I went out to celebrate at a quiet dinner. **Then** I found out that Roger would have left me off the hook if I produced just a single good channel!

The motivation behind Roger Fotso's expenditure might interest some who might be looking for additional international marketing opportunities. This coming June and early July, the World Cup Soccer matches will be held in Spain. Soccer is **the** international sport. While it has a limited following in North America, it stops everything else in its tracks in most of the world. This year, for the first time, Cameroon has a team that will be participating in the World Cup. There is intense interest in seeing how the team does, and, in following the **52 game series**. Yes, that is a lot of soccer!

Roger hoped that if the system worked, he would be able to share the soccer coverage with his fellow countrymen. One avenue explored was to install large screen projection equipment in his theater chain and simply couple the TVRO reception onto the big, silver screen, using projection TV. Another possibility was the rush installation of VHF TV transmitters in the principal population centers.

A I left Cameroon for the long trip home, Roger Fotso was also heading out. He was on his way to Spain to negotiate with the broadcasting and soccer authorities for the legal rights to receive and retransmit (using whatever system could be put together in a hurry) to his country.

Postscript

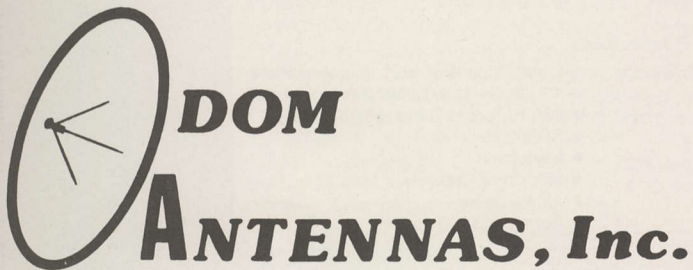
Seemingly, having mounted a successful '**African Satellite TV Expedition**' would spell the end of this saga. Actually it is but the beginning. One of the immediate tasks ahead is the installation of up to 10 additional twenty foot Hero receiving systems in Cameroon; part of the planned coverage for the World Cup Soccer matches.

The other rush project is to get a solid, engineering handle on the receiver part of the system. The AVCOM receiver performed beautifully, but it was not really designed to handle the wide variety of signal formats one finds with Intelsat feeds. The most pressing problem is the ability to switch between optimized 15 MHz wide (half transponder) format video signals and full 30 MHz wide format signals. A

secondary problem involves being able to switch to an even wider IF passband for the 50 MHz wide (nominal) Russian signals. Preliminary tests with a proto-type AVCOM Intelsat-grade receiver indicate that there is a substantial improvement to be had with optimized video IFs. For example, in mid-March we are working with an AVCOM proto-type in this area, at our Miami headquarters, which brings in 8 or more Intelsat video signals on our shop 20 foot dish. Several of these are totally noise free in the half transponder deviation format, whereas with a stock AVCOM receiver only two signals are identifiable and none are noise free.

The video de-emphasis circuits are also suspect; Intelsat and Russian standards vary some from our Americanized NTSC format video signals and there are refinements than can and should be made to any receiver heading for Intelsat operation duty. Next there is the audio recovery 'problem'. Intelsat program audio is apt to be transmitted at 5.8 MHz, but not always and seldom on the news feeds one sees winging their way west from Paris to New York, for example. Not only do the frequencies vary, but the audio deviation (bandwidth) also varies. This suggests a tunable audio system that covers the range from 5 to 8 or more MHz, and then that must be coupled to switch selectable audio bandwidths to optimize the audio signal to noise ratio. All of this is being worked on very earnestly, under the crush of a deadline in Cameroon. The 'technology fallout' from the first African Satellite Expedition will benefit all of us for years to come, however.

The substantial progress made, in recovered video and audio quality signals, at our less-than-ideal Miami location suggests that we are as an industry on the threshold of showing the folks at Intelsat just how good a relatively small 20 foot terminal can perform. I have great respect for the innovations COMSAT Labs turns out. But I have as much and perhaps more admiration for what a few talented people, such as Andy Hatfield of AVCOM, can and have done with (relatively speaking, by Intelsat standards) "low cost" receiving equipment and systems. Just as this industry demonstrated to the US TVRO hardware manufacturers that commercial performing terminals do not need to cost upwards of \$14,000, so too shall we demonstrate to the



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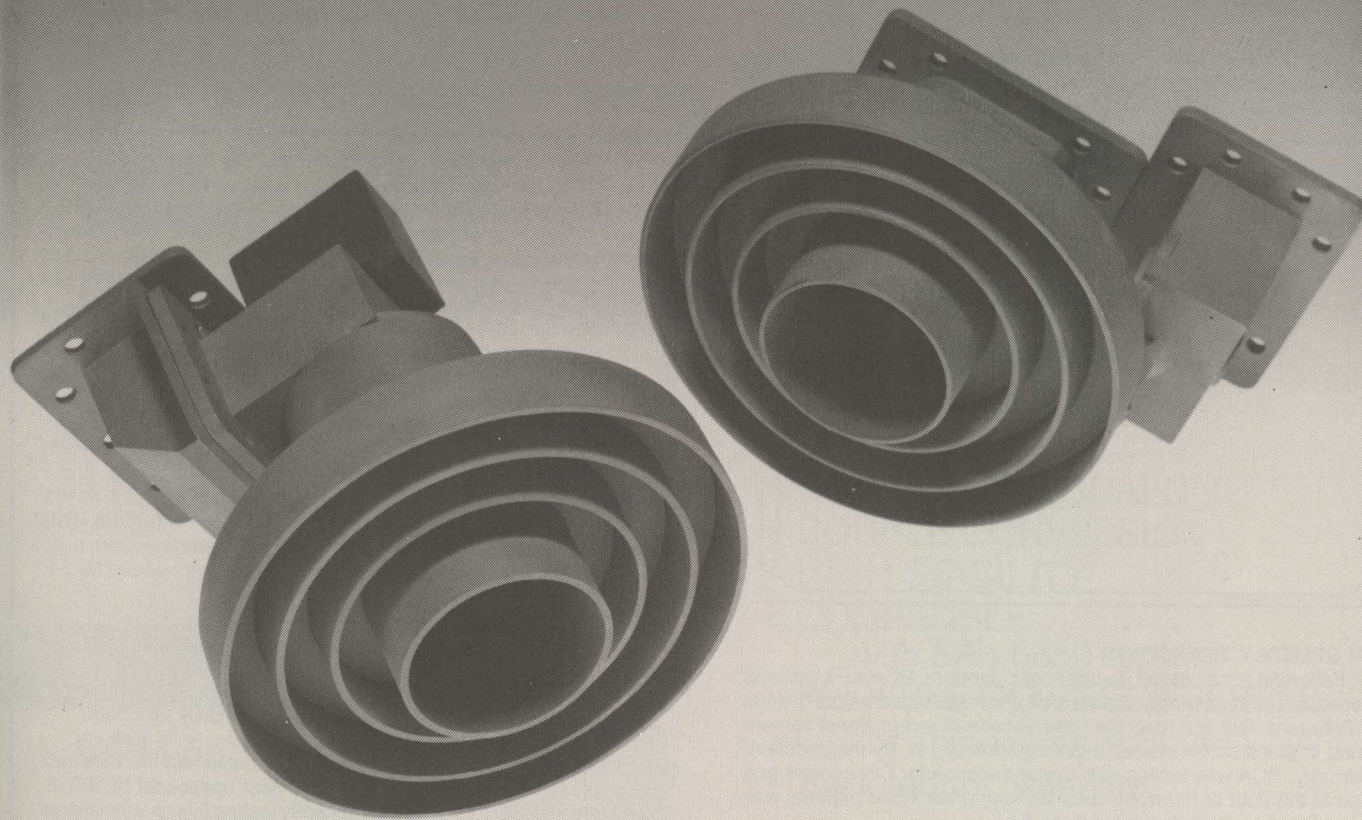
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Editor's Note:

I was amused, perhaps dismayed, when last fall while in South Florida putting **CSD** together I viewed a **PM Magazine** segment telling about home satellite terminal reception. To tag the nationally distrib-

buted home TVRO piece, the Miami station found a local seller of home TVRO equipment to interview. The chap interviewed told how "he" had taken a Luly Umbrella antenna to St. Maarten and Barbados, in the eastern Caribbean, to "prove" satellite reception there. What he attributed to himself was what he read about here in **CSD**. Only he was **not** the fellow who went into the eastern Caribbean to break new ground there; Bob Behar was. I hope that those who read this 'African Satellite Expedition' report are not 'tempted' to go on local television to take credit for bringing satellite TV to Africa!

PRELIMINARY F4 DATA

AN ORDERLY TRANSITION

Following a successful launch in mid-January, RCA's F4 bird was placed into geo-stationary/Clarke orbit and tests begun before the first of February. The first reported observations of swept signal carriers being in place on F4 started around February 1st. By the middle of February, RCA was testing with single-transponder CW carriers and around the 20th of February color bar and other video material was found for short periods each day on F4.

There were many rumors, and erroneous reports, about how F4 would become activated. Several (three actually) distinct groups of programmers will move to, or appear on, F4 in the months ahead. First there are those who have been feeding cable programming over on the D1/D2 combination. Way back when F3's original flight disappeared, RCA arranged with Comstar to use the D2 bird on an interim basis as 'CableNet 2.' This was supposed to provide a relief valve for the escalating demands on F1 by cable programming firms anxious to reach cable systems. The D2 operation never proved to be a very successful system since many of the cable programming firms who ended up there had less than widespread appeal. Lacking good cable system support, the effort reached a growth plateau early and virtually stagnated.

More recently, Comstar put the D4 bird into operation at 127 degrees and with this new satellite operational, moved the old and ailing D1 bird to share the location of D2. It then turned out, by Comstar admission, that D2 was not very healthy either. The two together made less than a single 'healthy bird.'

As recently as February, one could find as many as six cable programming services, on 5 transponders, on D1/D2. Two of those six, and 2 of the five transponders, were duplicate feeds for Cinemax (east) and HBO (east). That clearly indicated the depth of the D1/D2 acceptance problem; only four 'new program services' on the satellites, and of those four, two were religion.

On March 1st, the feeds on D1/D2 ended and they simultaneously began operation on the new F4 bird. There were also reports that the same services would be feeding on F1 (remember F1?) for a brief period of time. Those reports were in error.

The F4 bird, at 83 west, is the furthest east operational satellite in the North American domestic belt. For observers along the western side of North America, F4 will be their first experience with relatively low look angles. For observers in the eastern U.S.A., F4 will provide the opposite effect; a bird high in the sky.

The F4 bird is identical in design to the recently activated F3R bird. However, F3R sits **west** of the main target area, while F4 sits south or southeast of the main target areas. With identical transmitting antenna patterns, the effects of being **higher in the sky**, and looking **more directly at the target areas** (than F3R), will prove to be interesting to track and record. And initial results reported from all corners of the continent suggest that what we have in F4 is the almost mirror image of F3R. That is, those transponders which were stout on F3R appear to also be the strong ones on F4. And, the signals that proved hottest on the west coast with F3R are in turn the signals that seem to be hottest on the west coast with F4.

Unlike F3R's activation, however, there will not be a sudden turn-on of the F4 transponders. It may well be late in 1982 before the last of the presently sold F4 transponders is actually in use, and it could well be mid-1983 before the bird is considered 'full' by RCA. In a sense, the legacy of D1/D2 is following the early growth of F4. This bird will not be an 'overnight' programming success.

As noted, there are three groups of programmers headed for F4. The initial services operating are:

TR6 / Bravo, daily 8 PM to 6 AM eastern.

TR7 / National Christian Network (NCN), daily 6AM to 8 PM eastern.

TR7 / Escapade, daily 8PM to 6AM eastern.

TR17 / TBN (Trinity Broadcasting Network), daily 24 hours.

TR19 / American (Movie) Network.

Additionally, when last operational, D1/D2 also had the Cinemax east coast service on TR13, while HBO east coast was on TR18. Since March 1 HBO has been intermittently testing five channel digital audio transmission techniques on TR18 (see **Coop's Comment**, this issue of **CSD**). Some CW (non-modulated) carrier testing has been noted on TR15. And that has been about the excitement of F4 through early March.

During the next six months, several new and perhaps even half-way exciting services are scheduled for coming on board F4. RCA still has not confirmed the transponder allocations for each, so what follows may prove to be less than solid as relates to the actual transponder assignments:

TR8 / RCTV (The Entertainment Channel), a premium service operated by RCA; scheduled launch is June 4, 1982.

TR16 / Black Music Television, scheduled launch July 15, 1982.

TR23 / UTV invovision, scheduled launch 'summer' of 1982.

This suggests that by early fall, there may be seven additional services on F4. There is, however, another element involved; the 'WOR saga.' WOR currently appears on F3R, TR17, courtesy of a common carrier called Eastern Microwave. Eastern has been sub-leasing TR17 from Showtime (Westinghouse) for several years. Effective June 21, 1982, a new 24 hour per day service called 'The Weather Channel' will appear on TR17 and WOR is scheduled to get the boot. WOR now reaches into an estimated six million homes via satellite, and unlike indie KTVU which used to be on transponder 1, from Oakland/San Francisco, this is too big a market to simply 'drop.' Eastern is looking for a transponder, and they would like to be on a bird where they will retain as many of those six million homes as possible. There are two possibilities in the immediate time frame; F4 or W4.

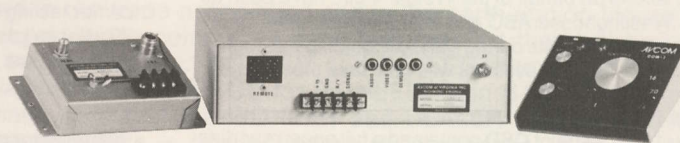
The decision at Eastern Microwave is simply one of bucks. They have to decide whether one year, or two years from now, there will be more cable dish antennas looking at the F4 bird, or the W4 bird. Or perhaps another bird not yet launched. Their success on F3R/F1 has been largely due to their being readily available to the cable firm. If the cable firm already had an antenna, LNA et al pointed at the satellite, selling the cable firm on taking the channel was simply a matter of

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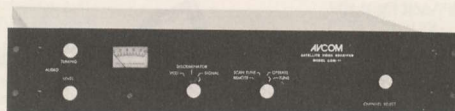
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direct salesmanship. The investment for the cable system boiled down to adding another receiver and modulator. But if the cable firm has to also buy an antenna for a new satellite, well, that becomes a more complex selling job.

In spite of the weighty efforts of RCA to make F4 the 'CableNet Two' satellite, the efforts on behalf of the Westar 4 bird have been far more productive. Westinghouse/ABC and their Satellite News Channels (due to start on W4 sometime during May) are beating the bushes offering free equipment to cable systems willing to take their service.

REPORTING ON F4

The February (1982) issue of **CSD** contained a full page 'reporting form' on which you are asked to record and report to **CSD** your observations of F4 signal service levels. Obviously, if we wait until RCA has F4 all filled up, the bird may be several years old before we publish a composite look at F4 coverage. Therefore, we are asking readers to make their observations of F4 signal levels between April 15 and April 22, to complete the form with the channels in operation on F4 at that time, and to send the data into **CSD** for our completion of a continent-wide look at F4 service contours. This will allow us to get the data analyzed and back to you, in print, by the June 1982 issue.

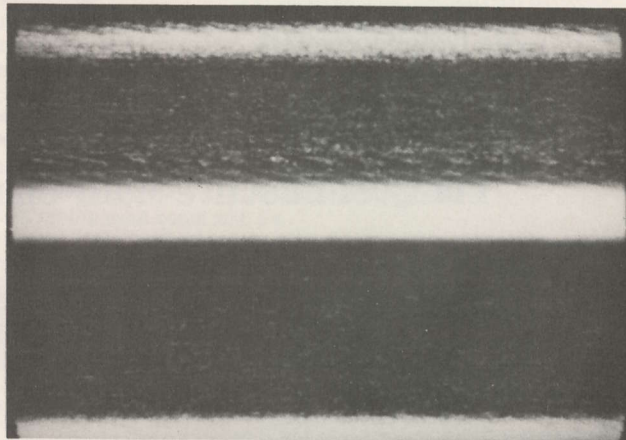
AN UNUSUAL SITUATION

The launch of the brand new, 24 channel, 8.5 watt transponder Westar 4 satellite was described as 'textbook.' The bird lifted off February 25th and was jockeyed into a temporary, check-out position of 79 degrees west; just 4 degrees east of the F4 location.

Western Union will use W4 to replace the Westar 1 satellite, at 99 degrees west. The transition will be unlike anything the industry has previously experienced, and until W2 and W3 are replaced, there will not be another opportunity to see so much happening in a short period of time.

Westar 1 is currently heavily used by the three networks plus Wold Communications, (appearing on TR1, 5, and 9 on a 24 channel receiver), plus PBS (appearing on Transponder dial positions 15, 17,

21 and 23 on 24 channel receivers), plus occasional video feeds on TR11 and 13 (again, as found on a 24 channel receiver). All of these services must have continued service, and in the case of PBS there is no easy back-up that can be wheeled into temporary operation. So Western Union is having to locate W4 at 79 degrees west, where it will remain until all of the sweep testing, CW carrier testing and initial video carrier testing is completed. You should be able to swing your dish to 79 west as you read this, and check out the progress of the check-out exercise. Just find F4, and head on east to the next (sequential) orbit location.



SWEEP TESTING OF W4

Once W4 check out is complete, a transition day will be established. Just ahead of the transition day, W4 will silently be propelled into a drift mode that will take it up close to W1. There may even be

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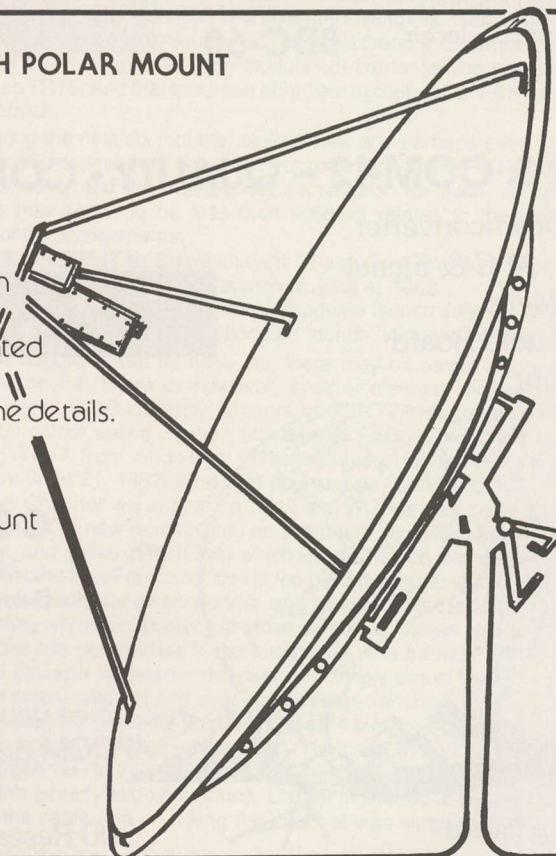
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COOP'S SATELLITE DIGEST W1 TO W4 COMPARISON ANALYSIS

Instructions: W1 is a 12 transponder satellite and video is normally found only on transponders 1, 3, 5, 6, 8, 10, 11 and 12. These numbers on a 24 channel receiver appear as 1 (1), 5 (3), 9 (5), 11 (6), 15 (8), 19 (10), 21 (11) and 23 (12). Make your W1 observations **between** March 15 **and** 31st to insure you are not caught by surprise. Make your W4 observations (24 channels, same as SATCOM F3R channel allocations) on the **SECOND** day **after** first service switches over to W4 FROM W1.

Your Name _____

Address _____

Town/City _____ State _____ Zip _____

Dish Size _____ feet; LNA Temperature _____; Receiver Type _____

W1 Observations: Made at _____ ST on _____, 198 _____.

W4 Observations: Made at _____ ST on _____, 198 _____.

W1 Observations

Trans. 1(1) _____
 Trans. 2(3) _____
 Trans. 3(5) _____
 Trans. 4(7) _____
 Trans. 5(9) _____
 Trans. 6(11) _____
 Trans. 7(13) _____
 Trans. 8(15) _____
 Trans. 9(17) _____
 Trans.10(19) _____
 Trans.11(21) _____
 Trans.12(23) _____

Note: Numbers in () indicate dial reading on 24 channel receiver.

W4 Observations

Trans. 1 _____
 Trans. 2 _____
 Trans. 3 _____
 Trans. 4 _____
 Trans. 5 _____
 Trans. 6 _____
 Trans. 7 _____
 Trans. 8 _____
 Trans. 9 _____
 Trans.10 _____
 Trans.11 _____
 Trans.12 _____
 Trans.13 _____
 Trans.14 _____
 Trans.15 _____
 Trans.16 _____
 Trans.17 _____
 Trans.18 _____
 Trans.19 _____
 Trans.20 _____
 Trans.21 _____
 Trans.22 _____
 Trans.23 _____
 Trans.24 _____

Best Six Transponders

On W1:

_____, _____, _____, _____, _____, _____

On W4:

_____, _____, _____, _____, _____, _____

Notes:

If you are capable of CNR measurements, please use that technique in reporting. If not, and you have a receiver with a relative signal level meter, use **actual** meter readings in reporting. If neither applies, use "B" (better), "S" (same) or "W" (worse) indication on W4 signals on a transponder-service by transponder-service basis (i.e. **compare PBS feed on TR8/15 to whatever transponder that same feed shows up on, on W4**).

If your receiver has a dual purpose meter (i.e. discriminator **and** signal level), be sure it is in signal level mode!

Trivia and other observations:

brief periods when both W1 and W4, at the same approximate location, are allowed to operate in 'stereo' for final test purposes. Then W1 will be shut down, and W4 will take over. In the process, the transponder capacity will double (from 12 to 24), the 99 degree west spot will turn from a horizontal-only bird location to a horizontal and vertical location, and we will have our first look at 8.5 watts output power on 21 of the 24 transponders on board; video modulated.

The Westar 4 (and later this year, the Westar 5) birds have been a long time coming. Western Union has a great deal riding on their successful deployment and operation, and many of the more exciting new cable oriented programmers have their fingers crossed as well.

There is, of yet, no precise date known as to the transfer from W1 to W4 service. It is not likely to come prior to March 25th and it could be as late as April 25th. There appears, with this report, a reporting form for you to use, in recording the W1 service levels and after the transfer, the W4 service levels. We suggest you make your **W1 observations** not later than March 30th, and then ride it out waiting for W4 to take over. If you watch testing, over at 79 west, there may be a clue here as to when the W4 move to 99 west will take place. If the W4 testing has been apparent on a daily basis, **and it suddenly stops**, that would be a signal that W4 testing has ended and the physical move from 79 to 99 is underway. To conserve fuel, that thruster burn will be brief, and the W4 bird will 'drift' most of the way to 99 west; under telemetering monitor control during its secondary flight west. It will probably take several days for the trip and re-check out. Anytime after the testing at 79 ceases, you should be alert for a turn on at 99 west. The chances are good that full updated instructions will be on the PBS channels on W1, during their off-programming hours, so an occasional check of the PBS channels on W1 should alert you to what the latest information is.

MARCH 20th update: WU Will shift traffic from W1 to W4 starting at 4AM April first. Detailed report in May CSD.

After The Move . . .

Western Union is dedicating 21 of the 24 transponders to video. Unlike F4, a high percentage of these will be in operation within 30 to 60 days of W4 turn on at 99 west. Transponder line ups are either not firm, nor confirmed, as we prepare this report. The user group looks like this:

- 1) PBS / currently using up to four transponders on W1, will use 4 on W4.
- 2) Westinghouse/ABC Satellite News Channels / will use five transponders on W4, (one of which will be the 'main news channel,' 3 of which will be used for rotated regional feeds, and the fifth of which will be an inward bound channel for reports coming into the central bureau).
- 3) CBS Cable, will move from Westar 3.
- 4) Southern Satellite Systems (SSS) will move from Westar 3.
- 5) Wold Communications will move from Westar 3 (FNN).
- 6) Spanish International Network will move from Westar 3; XEW service.
- 7) Spanish International Network will move from Westar 3; network service.
- 8) ABC's leased service channel on Westar 3 will move to W4.
- 9) Cable News Network's leased service channel on Westar 3 will move to W4.
- 10) Hughes Television Network will move from Westar 3.
- 11) Satellite Communications Network will move from Westar 3.
- 12) Bonneville Communications will move from Westar 1.

This is a total of 19 dedicated video transponders. There will **also** be three audio SCPC/FM-FDM dedicated transponders, and a pair of 'occasional video' service channels. Presently, NBC feeds the central time zone version of the Today Show, ABC feeds the west coast edition of Good Morning America (etc.) as occasional video service on W1.

With so much video coming off of Westar 3, and moving to Westar 1, this will free up Westar 3 for either expanded audio and data traffic, or for expanded ABC/CBS/NBC network program feeds. Several other 'announced' services are scheduled for use of W4. However,

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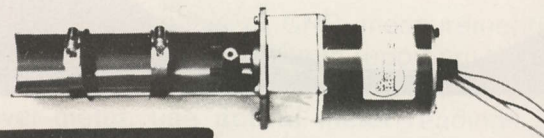
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only 'The Home Music Store' and possibly 'The Eros Channel' are likely to be on W4 before W5 is operational. W5 will replace the ailing W2 bird at 123 west, and at that time Westinghouse plans to move all five of their transponders off of W4 over to W5; thereby freeing up the W4 transponders initially occupied by the Satellite News Channel. Unlike the present 'near term future' line-up for RCA's F4 bird, the Westar W4 (and W5) birds seem to have more 'solid' transponder candidates than they can shake a stick at.

This One is Important

Every new bird placed into operation presents new, and often unique opportunities to grow with the industry. However, because this is the first of an entire new family of Western Union satellites, and because there are power increases, dual polarization antenna configurations and boresight adjustments all changing from past Westar birds, the results from W4 will be very educational indeed. We'll look forward to reporting back to you on how the bird is working.

DAVID'S TVRO VIDEO NOTES

by
David Barker
GHz Engineering



With the ever increasing amount of audio and data subcarriers appearing on the various satellite transponders, and a large number of 'Howard Breed' video processing receivers in use, it may be very worthwhile for such receiver users to make a couple of small changes to the low pass filter portion of the receiver.

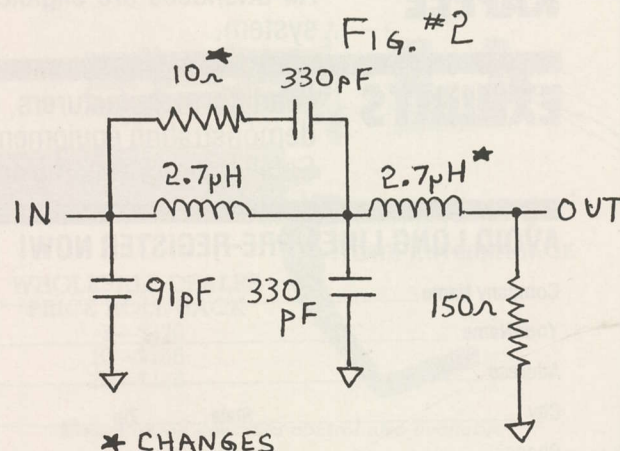
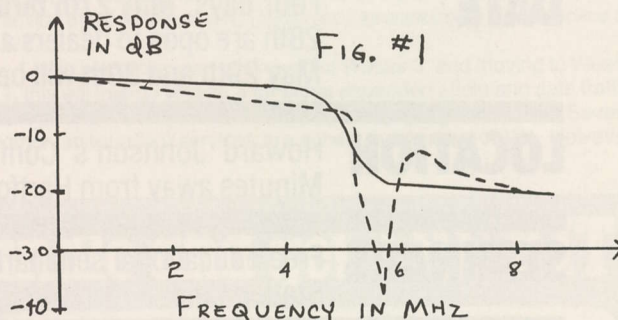
The addition of external subcarrier 'processors', such as the Arunta units and ICM units, require a pretty decent, flat, video passband out of the receiver and into the external processors, to insure optimum performance with the external processing units.

The changes to be noted here improve the overall frequency response of the video output circuits. They can be made without drilling any holes or making any 'hard', physical, changes to the basic receiver. If your receiver already has an unfiltered video output, these changes may not make the external processor unit work any better, but they will improve the video response of the basic receiver.

When made, the changes to be outlined will give you a couple of additional dB of color (and high frequency video) information, while still maintaining the original (or even improved) reduction in out of passband non-video carriers and noise. This improved performance is obtained by obtaining a more ideal video response from the video low pass filter. In **figure one**, the dotted line is the circuit before the changes while the solid line reflects the circuit after the changes.

The first modification involves adding a 10 ohm, 1/4 watt resistor in series with the 330 pF capacitor that is in turn in parallel with the 2.7 microhenry (RF) choke. See **figure two** (the exact parts values may vary slightly from manufacturer to manufacturer but the circuit will be as shown here). This change will increase the 5.8MHz output in the video response. The second modification requires that you change the 4.7 microhenry choke to a 2.7 microhenry choke. The result here will be a much flatter 0 to 4.2 MHz (video information) response, and this will be particularly noticed with improved color levels.

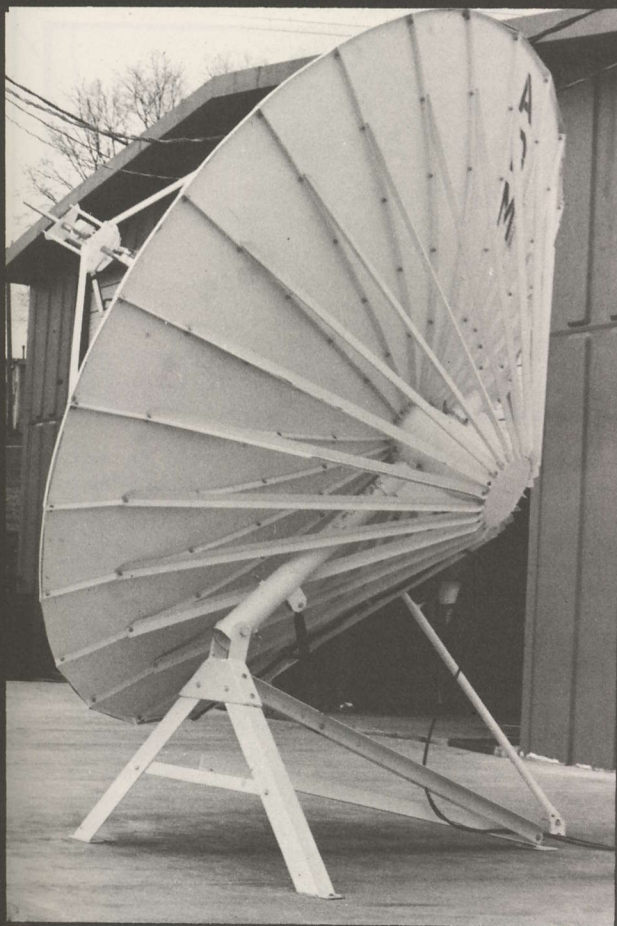
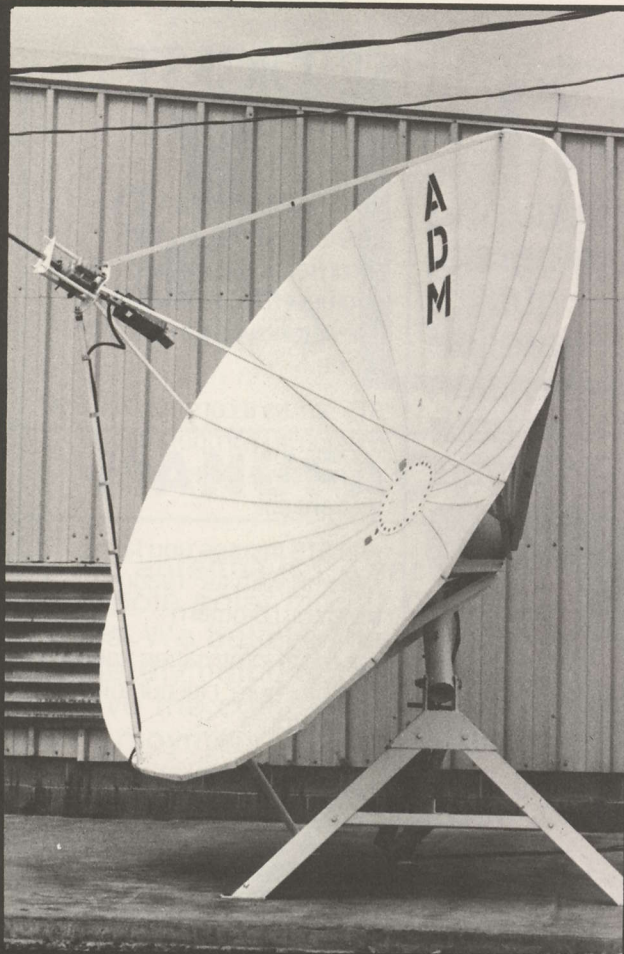
When connecting an external subcarrier demodulator/processor, there are two common methods employed. If the external unit has a (video in/out) loop-through, then you are in effect bridging the video output line in between the TVRO receiver and the outboard video monitor (and/or RF re-modulator. If the external demodulator/subcarrier processor does not have a loop through provision, one simplistic method of 'feeding it' is shown in **figure three**. A coaxial 'T' fitting, available at most wholesale houses, is inserted into the line between the TVRO receiver and the modulator/monitor. The top or straight-through portion of the T takes the TVRO baseband video into one side, and the opposite side exits to the modulator/monitor. The bottom or



* CHANGES

base of the T in turn feeds the external demodulator/processor. If this approach is used, the jumper from the base of the T to the demodulator must be kept short, and, in 75 ohm coaxial cable. In either case, the last unit in the line, the modulator/monitor, should have a 75 ohm termination or load so that the video source back at the TVRO signal 'sees' a proper end-of-path 'match.'

In future editions we'll look at video processing systems and investi-



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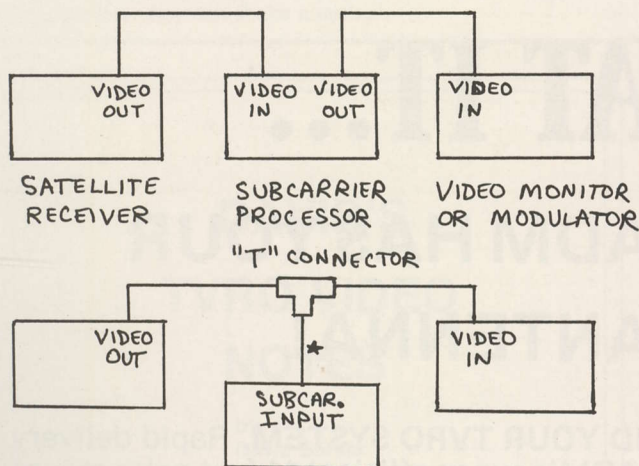


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FIG #3
METHOD ONE



★ THIS JUMPER MUST BE SHORT

METHOD TWO

gate what can now be done, and what may be done in the future, to improve video quality and actually 'cancel' video noise on weak, below threshold carrier level signals.

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HARD CNR NUMBERS / F3R

Here is my contribution to the F1 and F3(R) comparison. All of the data is carrier to noise corrected, from a 10 foot dish and 120 degree Dexcel LNA. The location is San Jose, California:

F1 Transponder	CNR	F3R Transponder	CNR
1	7.2 dB	1	9.3 dB
2	9.7 dB	2	11.8 dB
3	8.4 dB	3	12.7 dB
4	missing	4	9.5 dB
5	8.3 dB	5	10.8 dB
6	8.5 dB	6	11.1 dB
7	10.0 dB	7	12.6 dB
8	6.5 dB	8	10.6 dB
9	8.1 dB	9	11.3 dB
10	9.5 dB	10	12.1 dB
11	6.7 dB	11	13.6 dB
12	7.8 dB	12	10.1 dB
13	9.2 dB	13	11.3 dB

14	8.5 dB	14	11.1 dB
15	10.3 dB	15	13.5 dB
16	missing	16	11.2 dB
17	9.4 dB	17	11.5 dB
18	9.9 dB	18	11.4 dB
19	8.4 dB	19	11.1 dB
20	7.5 dB	20	10.6 dB
21	10.2 dB	21	missing
22	9.7 dB	22	11.5 dB
23	10.2 dB	23	13.8 dB
24	8.1 dB	24	11.8 dB

In my location, with my ten foot terminal, the F1 vertical transponders averaged 8.8 dB CNR while the horizontals averaged 8.6 dB CNR. The overall average was 8.7 dB CNR. On F3R, the vertical average is 12.0 dB, the horizontal average was 11.0 dB resulting in an overall average of 11.5 dB CNR. This makes the overall F3R improvement 2.8 dB in CNR.



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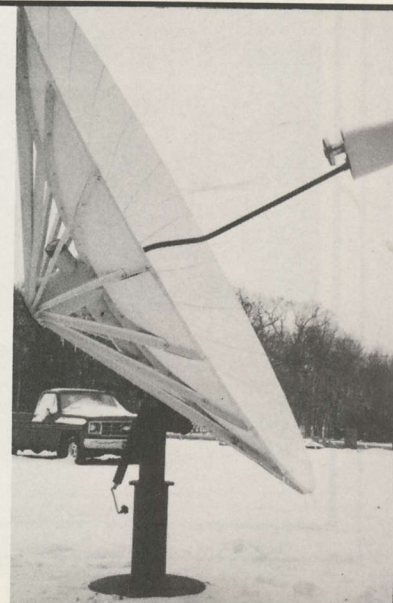
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Mike Gustafson
Satellite Receiving Systems
1515 Jervis Court
San Jose, Ca. 95118

Thanks for the data, Mike. Now to see how F4 footprints compare with F3R!

SPEAKING OF WHICH . . .

I read with great interest your reports on F3R reception in CSD. As Director for Satellite Transmission Facilities for United Video, Inc., I will be very interested in sharing the results of the F4 to F3R comparison tests and analysis. If in the future I can be of assistance, please do not hesitate to contact my office. As you can gather, I am an avid reader of **CSD**! As a final note, United Video commenced operations from our own satellite transmission facility on August 28, 1981. Our facility is located just outside of Chicago, in Frankfort, Illinois. During our change-over, from F1 to F3R, we were transmitting from our own facility, not from the RCA Lake Geneva facility.

Michael T. Peyton
Director of Satellite Transmission Facilities,
United Video, Inc.
5200 S. Harvard, Suite 215
Tulsa, Ok. 74135

The improvement in WGN satellite video quality, since United Video began operating their own off-air pick up point and uplink site in Frankfort last summer, has been dramatic. Good job, Michael. For those who may need information regarding the technical operations of WGN on the bird, Michael's telephone number is (918) 749-8811.

NOT ALONE

Thank you for the recent comments in CSD concerning our (still) new DD3000 satellite TV receiver. I am, however, uncomfortable with the impression given that I alone am responsible for the innovative engineering on this, and other Arunta products. Arunta actively

seeks new TVRO product designing from outside engineers and experimenters, and putting them into our production lines and distribution.

Edward Grotsky
President
Arunta Engineering
Box 15082
Phoenix, Az. 85060

Good point, Ed. It is really a great concept. Many people sit in their garage or basement shops snipping and wiring away looking for better ways to produce satellite video or audio. Then when they get something that works good, what next? Well, you could take it to Ed Grotsky and crew for evaluation. If they like what they see, it will shortly become a product which they license from you to manufacture and distribute. What a great way to get into the satellite business, without the hassle of setting up a shop!

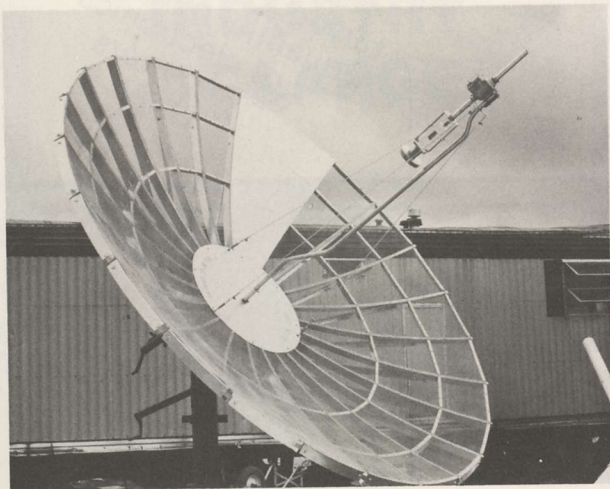
ANOTHER OFF-SHORE

I will be transferred to Port Of Spain, Trinidad, West Indies in the near future and I would like to set up the most inexpensive but effective TVRO dish system to pick up US TV signals. Any information which anyone can give me as to the appropriate dish sizes, who to have make the installation in Trinidad, and whether this is even possible to do, would be greatly appreciated. I just cannot seem to get any solid answers from those whom I have talked with, so far.

Andrew V. Stadler
5 Tahoe Ct.
Newark, De. 19702

With the activation of SATCOM F3, there are at least six signals which would be of good to excellent quality on a 20 foot dish in the far eastern Caribbean. They are WGN (TR3), ESPN (TR7), MTV (TR11), CNN2 (TR15), C-SPAN (TR19) and Cinemax (TR23). Reports on Satcom F4 are not yet complete enough to suggest which, if any, of that bird's transponders would be

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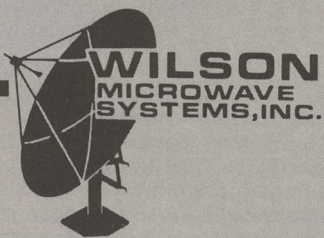
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useful in Trinidad. The F3 signals will be at a look angle of under 10 degrees in Trinidad, which means smaller dishes will be difficult to make play because of terrestrial noise pick-up by the small dish sidelobe patterns; even if the signal strength (EIRP) is reasonably good. F4, on the other hand, if it turns out to have a useful EIRP pattern in the area, would be up in the 30 degree elevation range, which could make good pictures on a dish as small as 12 to 14 feet. We'll know more about the F4 characteristics in another month or two.

DIGITAL DEMOD REBUTTAL

I was rather surprised at a statement in the January CSD (page 15) which said those who are working with digital demodulators have not been able to tame them for mass production yet.

I believe you may have overlooked Teknimat, which has been using a digital demod since the fall of 1980. In production terms, this circuit has been absolutely flawless and outperforms other comparable demod circuits. In this age of "copy cat R and D", I have always been surprised that some of the other companies did not pick up our design. Teknimat has been and will remain innovative in the field of design. We are one of a very select group of companies that design and manufacture VTOs, mixers, and filters, in house, for our own production purposes; rather than "buying out". Although copy cat R and D enables a company to put a product on the market quickly, it does little to advance the industry in terms of technology and design. This particular challenge is I suggest, "the challenge", of 1982.

Daniel Bernesi
Chief Engineer
P. Sherman Enterprises Quebec, Inc.
4000 Cote Vertu
St. Laurent, Quebec
H4R 1V4

We admit it Daniel. We did 'overlook' the Teknimat demodulator in our overall review of receiver designs. This brings up an important point, however, which all manufacturers should take note of. When you introduce a new product, take a few minutes to

set down, on paper, a description of the product, what it does, and where you are doing something innovative, don't hide it under a bushel basket. Speak right up and lay claim to being the first to be doing this, or that. Engineering innovation has been the name of the home TVRO game since this business began in 1979. Hiding production innovation in small balck boxes buys you very little in the form of security; you 'creative' competition will in short order discover what you are doing, and steal it anyway. So why not lay claim, in CSD, to being the first to have done it? This industry loes a lousy job of sending out engineering-type press releases that properly and adequately describe new products, and it makes it more difficult for us to dig out what you are doing so that you get proper credit for being 'first'.

Last summer we looked at the Teknimat receiver and found it to have exceptionally good sensitivity and color fidelity. We did, however, find the audio response heavy on the bass side, and the fine tuning sensitivity to be overly critical to hand manipulate. Here is an update in both areas. To redice the bass on the audio, change the capacitor in IC 1357 from .1 uF to .01 uF. And to reduce the fine tuning sensitivity, locate the LM 324 IC and note pin 10. Change the 150K resistor for a 270K resistor. In a third area of improvement, if you find this receiver to have excessive AFC sensitivity, locate IC 6-10 and change the 100K resistor to a 330K resistor on the lead going to the AFC switching.

POLARIZATION ROTATION

I read Bob Cooper's series of articles appearing in Radio Electronics Magazine and I am nearing completion of a parabolic dish of my own design. My engineering experience has included work on multi-gimbaled systems and related coordinate-frame-transformation matrices. In relation to antenna mounts, I am concerned about the vertical-horizontal polarity rotation which occurs on an AZ-EL mount (and does not occur on polar-axis mounts). It stems from the inconsistency of a local V-H frame and the projection of one fixed in a satellite. The rotation can be as large as 90 degrees, depending upon the observer's latitude, and the related longitude of the observer and satellite.

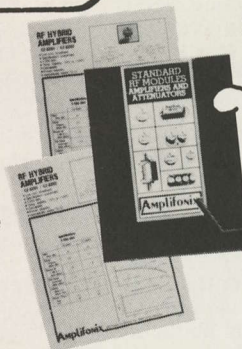
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The rotation is based on geometrical considerations only, and makes an assumption that no rotation of polarity occurs on the signal during transit.

Very briefly, an observer on the equator will see a 90 degree rotation. For other conditions an intermediate value is obtained. The equation which gives the amount of rotation can be derived using spherical trigonometry where the earth radius is assumed to be zero (the error introduced by this assumption is limited to a few degrees). The end result is that to correct for this situation, the feedhorn must be rotated back through the rotation angle of the satellite's polarized signal (s) to cancel this error. I have not seen this effect mentioned in the satellite literature.

Richard W. Fike
353 Calcaterra Place
Palo Alto, Ca. 94306

Your analysis is correct, although the literature has dealt with the problem extensively. Coop's Satellite Operations Manual spends pages discussing polarization rotation as a function of where you are, and where the satellite is. Motor or electronic feed rotation systems are included on most of the present generation of terminal dishes for two reasons; to make switching from vertical to horizontal possible, and, to allow the terminal user to adjust his feedhorn for polarization 'skewing'. This effect, to be sure, is much more pronounced on AZ-EL mounting systems, but it is hardly missing on polar axis systems. Virtually all home terminal systems now employ polar mounting systems since there is a simplistic ease that goes with tracking satellite signals on a single motor drive approach; AZ-EL mounting systems requiring dual motor drives and a constant jockeying of both drives to pinpoint the satellite(s) with each antenna system move.

UNHAPPY READER

My first year's subscription to CSD is now one third complete. Let me tell you about the articles I have found really useful. First there was Steve Gibson's article, full of circuits for the recovery of stereo audio. This is a fine example of do it yourself information, and the type that originally attracted me to CSD. Then in the operations end of things, your report on the move of NBC feed to D3, with audio on 5.8 MHz, was valuable. And that's about all! Of course I get a chuckle out of the mis-adventures of the traveling salesmen and installers. They remind me of the Alexander Botts character in the Earthworms Tractors stories of yesteryear. And it is mildly interesting to know there is a Russian bird over the eastern Atlantic. And I know now much more than I care to know about tropical corrosion problems!

You can guess that I am interested in the technical and experimental side of things (as you once were). SatGuide tells me alot about programming and transponder usage. Aviation Week covers launches and orbital adjustments. Wall Street Journal tells me about transponder sales and their cancellations. Satellite Communications tells me about the birds themselves. I counted on my CSD subscription to help me extend the capabilities of my equipment, and observations of new types of signals. It has, to some extent, but not nearly as much as I was led to expect based upon the issues of prior years. What I am hoping for is that you will return to the original emphasis on how to build it, and what to look at.

What would I like to see? How about circuits for recovering VBI signals, perhaps using microcomputers or their elements? Maybe sync pulse restoration and substitution (as you recently mentioned in passing). I'd like circuits for add-on features for older receivers, such as my AVCOM; such as AFC, metering, tunable audio and so on. How about some construction details for the soon to come 12 GHz band? Or how about circuits for block conversation of the 4 GHz band with simpler tuners at a lower frequency? I would also like some advance notice of what to watch for; just by accident I caught the coverage of the countdown and launch of the F4 bird.

Thomas W. Connolly, P.E.
Littleton, Co. 80121

We deal with your complaint, coincidentally, in Coop's Comment in this issue. We have also entered into a pact with David Barker, the fellow who made single conversion technology work. David was down here in the Turks and Caicos early in March and

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we spent a delightful several days taking equipment apart, digging into the signals we find on birds, and discussing how David might be able to generate some 'simple' circuits and tricks for CSD readers. He left us with a handwritten peice on video processing improvements which appears in this issue. He is now working on a series of articles dealing with sync regeneration or substitution and video processing in general. We are working on a series for the antenna builders detailing sub-reflector feed systems (so-called Cassegrain feeds), so things are looking up in the technical department. Hey . . . you think you know more about tropical corrosion problems than you care to know; how about us!

TUNING ANTENNA SURFACES

Those using or building spherical design antennas such as the Vidiark/McCullough design may be interested to know that there is another dB or more to be had with that design, if they need it. After reading the recent CSD story on Dave Fedric and the National Microtech X9 antenna (cutoff parabola with square sides, et al) I decided to review the 12 foot spherical design. Really, what we have here is a 14 foot spherical with the sides cut off. The 'inner circle' represents the effective capture area when the surface is tuned as a 12 foot antenna. The outer circle represents the same surface tuned as a 14 foot spherical, taking advantage of about 30 square feet on the upper, lower, left and right hand corners.

Some doubt ran across our mind as to how well this would work, especially since now our feed would be looking slightly outside the perimeter of the surface. So we 'retuned' the surface for an f/D of 1.25 (times 14'), or 17.5 feet. The net result was outstanding performance with additional signal on all transponders. If anyone has any questions, regarding spherical antenna systems, I will be happy to try to help them sort out their problems. A stamped, self addressed envelope would be appreciated.

Jerry Miller

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Oliver Swan ended up with a spherical design that was 'round' in shape, just prior to his death. Henry Swan carried on the round-like spherical in commercial design subsequently, and they found the 1.25 f/d optimum for the rounded version. It is nice to see independent verification of this pioneer effort!

400 ORIGINAL SUBSCRIBERS

You mention in the February 82 issue that you had about 400 original subscribers. I believe I am among them. My curiosity was piqued as to your developing your first subscriber list and how my name appeared on it. Don't misunderstand — I'm delighted! Your issues have been most informative and I look forward to each issue with great expectations.

Roylance H. Sharp

Florham Park, N.J. 07932

If I recall correctly, we printed some monstrous number line 3,000 of Volume One, Number One. Just over or under 400 of those were paid in advance. The people who had subscribed, sight-unseen, were largely from the first SPTS held in Oklahoma City in the summer of '79. However, we did do a mailing to a segment of our computerized list of those people who had ordered study packs/and/or STT manuals prior to the October 1979 first issue, and we may have picked up 50 or so from that. The balance of the first press run, perhaps 2,600 magazines, went out via third class mail as 'sample copies' to cable TV systems and others who we felt would be interested in what CSD had to say. How your name, precisely, ended up on a list we cannot say. But if you got a first issue and then subscribed, from the sample mailing, it stayed on only because you did in fact subscribe!

MORE F3R FEEDBACK

Here in Nassau, Bahamas, every signal we had on F1 got better on F3R. The most dramatic changes, as measured on my Washburn/Earth Terminals receiver, were transponder 3 that pins the meter on F3R, and TR 11 that doubled in apparent meter strength. Transponders 18 and 22 had the smallest change, although it was indeed positive.

Dr. Q.M.S. Richmond

Nassau, Bahamas

Transponders 2, 8, and 22 are worse here on F3R than they were on F1. Transponders 1, 3, 4, 11, 13, 15, 16, and 19 are better; the rest are the same, on an Autotech GLR 500 receiver with 120 degrees LNA and 10 foot dish.

Larry H. Walton

Walton Satellite TV Systems

Lebanon, Pa. 17042

TELSAT FORECASTS SCRAMBLING

I attended a talk on satellite TV given by Jack Crawford, VP of operations for Telsat. Mr. Crawford mentioned that there are people in the satellite TV industry working diligently on scrambling TV signals, which would put home satellite TV out of business. My rebuttal to him was that the electronic geniuses who developed satellite TV receiving equipment for private use would very quickly reproduce a descrambler for home use. His only re-reply was that scrambling will put home satellite TV out of business. Does he know something that I don't know, or is he bluffing?

Doug Barnard

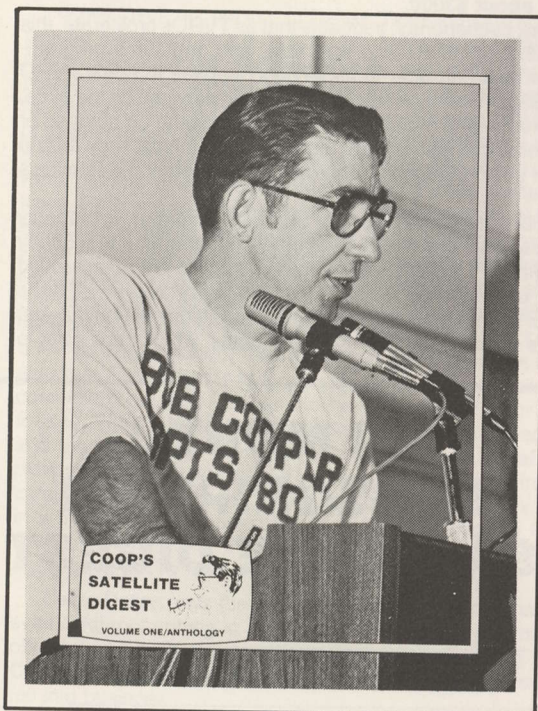
Sat-Receiver TV Systems

Deep River, Ontario

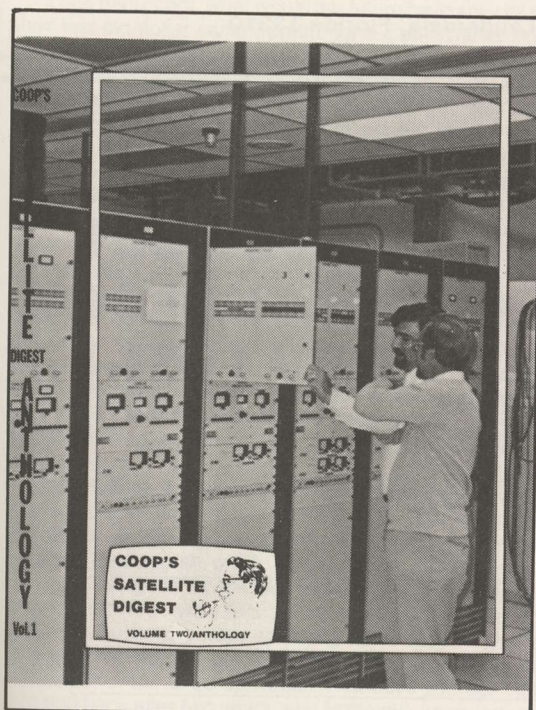
KOJ 1P0

He's bluffing. And he knows it. The Cancom system, a slight variation of the OAK Orion system, is far from genius proof. ANIK/Telsat has an ax of their own to grind. They want to control who watches their signals. They care not about the individual viewing home in remote Canada (Deep River does not sound very metropolitan to us!), and they have about as much passion as a melted igloo. The best minds in this business tell me that for anything less than \$15,000 per descrambler box, the end result is (1) lousy security (i.e. it can be easily beaten), (2) degraded video (i.e. once scrambled, it

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loses the crispness that satellite TV can deliver), and, (3) a high order of unreliability (Orion descramblers have a miserable track record in the field). CANCOM bought the Oak system because they had to promise to 'scramble' their 4 channel, 4 GHz service, to get approval of the the Canadian authorities. We know of several 'geniuses' who have broken the system and if we can coach one or more into sharing the data, we'll publish a how to do it article here. We think scrambling is great; just when we all got the hang of making basic terminals work properly, and the challenges had worn down, now we have something new to do with our spare time!

COOP'S COMMENT / continued from page 4

Lachenbruch is guilty of collecting a handful of unrelated facts, and tossing them altogether into a cutesy answer that did a dis-service to the reader's question (assuming Lachenbruch didn't make it up in the

first place; writers do that sometimes), and to the balance of the readers who, knowing very little (if indeed anything) about home terminals, **now understand** that they **may** need an (ugly) 16 foot dish antenna, **for about \$3000.**

Worst of all, Lachenbruch suggests that as TVROs proliferate, this may drive (all) programmers to scramble, and, the same programmers may (or may not) offer to lease descramblers to home TVRO owners. He doesn't mention that out of 60 or so services on the birds, at best a mere handful might scramble. He suggests, on purpose or out of a lack of sound information, that if **one** scrambles, **they all will scramble.** In unison, together. Thereby making the home terminals useless.

If Lachenbruch was writing in a Skokie newspaper, it probably wouldn't matter what he wrote, or what he did not take time to properly research. In (the) **TV GUIDE**, it does matter, primarily because around 20,000,000 people read what is written there weekly. That's 20,000,000 or so (now) mis-informed people. As a dealer you may get some strange questions in the next few months, which trace back to

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Lachenbruch's writings. Now you know where they are coming from, and you can deal with them appropriately.

DALLAS

Down (over, up, out in . . .) Dallas, Texas there is a bunch of guys scaring the sweet pea out of the big cable fellows. They call themselves "Cable/Dallas" and they have an interesting ploy going. Dallas granted a cable franchise to Warner Amex, after a tough, expensive, franchise fight. Now Dallas is a big town, and even with the resources of Warner Amex, it is going to take several years to get the city wired. Enter Cable/Dallas. They carefully looked at Dallas and decided there were 'clumps' of apartments, condos and the like scattered here and there. Each one might have from 200 to 2,000 individual dwelling units contained inside its perimeter, and they decided to approach a few of these to ask them how they would like "satellite delivered 'cable-TV-like' service"; tomorrow. Or sooner. A number of them said heck yes. So, using off-air pick up of the local signals, and satellite delivered services (Showtime, WTBS, WOR, WGN, CNN, Nickelodeon and USA Network included) they packaged up 18 channels for a reasonable fee. First they started out with stand-alone installations at the complexes, but then they went to the FCC and asked for a microwave license. Their intent is to consolidate into a single headed location, and then shoot the TVRO plus local signals to the affiliated complexes. Their FCC application has drawn plenty of fire from the cable camp, since Cable/Dallas will have to be granted microwave licenses in a frequency band normally available only to cable firms. Cable/Dallas says it is one; the cable industry says it is not, that it is an aggressive **MATV firm** trying to act like a big boy.

Cable/Dallas says they are in Dallas "for the long haul," and are even talking of putting in a 98 channel (!) system. Warner/Amex will offer 80 in Big D. Warner Amex spent years getting a franchise; Cable/Dallas spent weeks signing up a few apartment complexes to roll into business.

It is interesting to see Showtime signing up with Cable/Dallas; it is equally interesting to see HBO telling Cable/Dallas "no thank you," and refusing to sign. Cable/Dallas calls itself a mini-cable operation. HBO says they are really just an MATV firm, **and HBO won't sign with MATV firms.**

Long haul or not, what would the future be in any city now awaiting their first big dollar cable system, for a Cable/Dallas like operation? Probably pretty good, and here is why. The guy to the door, first, with a reasonably good representation of satellite services, is going to make a bunch of sales. If the mini-cable or MATV guy gets there first, he'll sell people. That will make it more difficult for the big-time-cable-operator (BTCO) to crack the same apartment building, or complex. Since the apartment is **privately** owned, the BTCO can't force his way in, claiming it is a public thoroughfare. He went through the city-franchise motions primarily to get the right to run up and down the public thoroughfares with his cable and attachments. But **that** franchise right stops at the edge of the public easement.

That puts Cable/Dallas in a nice spot. They cherry pick the best of the available satellite services, charge a reasonable rate for them, and concentrate on building — isolated (but perhaps one day microwave connected) "mini" cable systems. Now when the Warner Amex folks finally get around to offering their service on the complex's block, they can try to **compete** with the mini operator, **starve** him out by nibbling away at his hind end at city hall and elsewhere. Or, **they can buy him out.**

They tell me you can wire an apartment building of 200 units for about \$100 per unit. Plus the TVRO cost. That works out to around \$50,000 or so. Now if you are taking 100 times \$10 cash-flow out of the complex, each month, or \$1,000 per month, and you have a couple of dozen of these, you have a very valuable property to sell. If you sit on it and operate it for two years before selling, you'll have virtually all of your initial bucks plus your operating costs back. And when it comes time to sell it, you will probably be able to command a net price per subscriber in the \$700 up range. That says you get 100 x \$700 or \$70,000 back after two years, and in the two years you recover all of your initial cost. Now multiply that times a dozen or two such installations, and you are pretty close to being an instant (well, two year anyhow) millionaire. That sure beats selling a couple of dozen terminals to a couple of dozen farmers who pay you once and then never buy

from you again!

Cable/Dallas is sticking pins in Warner Amex in all of the right places. They are setting them up for a nice 'kill' about two years down the road; just when Warner Amex is starting to roll into high gear. And they are not alone. A similar approach, from a new, upstart firm headquartered in Phoenix (American Entertainment Network), is getting off the ground in Phoenix, Miami, Denver and Albuquerque. If it works in Dallas, it can be made to work elsewhere. BTCO's are just begging to be knocked over for a few hundred grand. Look around your territory and see if you can't scare up a few complexes of your own. It could turn out to be the most **interesting** couple of years you have ever had!

BETAMAX REVISITED

The decision of San Francisco Circuit Court of Appeals that home video taping of most (copyrighted) programming is a violation of the 1976 revised Copyright Law has the manufacturers and sellers of home VCR machines nervous. Sales of the machines continue brisk, however, and there is every indication that new buyers of the machines feel the court decision will have little or no impact on them, if they even know about or give the matter any thought.

There are three avenues of travel for the decision at this stage. First, the courts can again take up the matter (on further appeal), and it will probably go all the way to the Supreme Court if any of us live that long. As long as it is being actively appealed, the October court decision is held in limbo.

Or, Congress can intercede and enact new legislature which effectively modifies the Copyright Law, creating some type of 'exemption' for home videotaping. Numerous bills have been drafted, a few are headed into active consideration and some will undoubtedly make it into Sub-Committee level discussion. That will give everyone from MPAA's Jack Valente to VCR makers the opportunity to sound off before a half dozen dis-interested Congressmen. Any law that **makes** it to the floor of Congress will be moved ahead because of public pressure, or election-year theatrics; not because the conscience of a Congressman is pricked.

Thirdly, there is the possibility that between the courts and Congress and the manufacturers of VCR machines and tapes, they will work out a 'royalty payment' scheme wherein each time one purchases a blank roll of tape, a small amount gets earmarked for a 'royalty' to the copyright holders. That seems like an admission that the copyright folks are right, but there is some precedent for this 'expedient solution.' A similar plan, for audio tape blanks (and in three instances, videotape blanks) is already functioning in many European nations. It works well enough to satisfy the copyright holders there, so it has some merit.

As long as the matter is being appealed (formally, that has not actually happened yet), nobody will move to upset the present flow of machines and tapes. A growing number of video folks hope that Congress will **not** try to pass new legislation since if Congress does so, that kills the chances of a Supreme Court hearing. The videotape folks feel that they can always go back to Congress, years from now, if after all the Supreme Court rules against home taping.

Legal scholars point out that the Ninth Circuit decision is actually a correct one; that the 1976 law is a very detailed law, and it exempts or excludes what it wants to, by careful definition. It did **not** exclude home videotaping, and the court is simply saying that "lacking a specific exemption, they must assume the Congress never intended such an exemption." In effect, you don't escape the effects of copyright just because your name was left off the list.

What does this have to do with home TVRO systems? The same legal scholars who point out that home videotaping is not exempt from payment of fees would, we suspect, also point out that home TVRO reception, even on a private basis, is also not exempt. We didn't make the exempt list, possibly because in 1976 there were two of us; Taylor Howard and the Coopers.

If we can survive long enough, there is good reason to feel that "as Betamax Goes, So Too Will Home TVROs Go." The situations are very similar, in concept, if not in mechanics. SPACE has been pointing in that direction for two years now, by offering to make monthly or annual payments to the copyright/licensee holders for rights to access their programs. That's a plus on our side; home VCR owners have not

offered to pay anyone for their home taping. How Betamax goes, in court, in Congress, or in arbitrated settlement, will give us all something to carefully follow, consider, and weigh as we approach our own "TVROmax" suit.

TECHNICAL ARTICLES

Every couple of days or so we receive a letter from a reader who wants to know more about GaAs-FETs, demodulator design, waterproofing connectors and the like. Every week or so somebody comes along and writes to remind us that 'back in the early issues of CSD there was loads of do-it-yourself, technical material.'

In the 16 page two-year wrap up, appearing in the recently released **CSD Anthology**, I address this issue and point out that virtually all of the really significant technical innovations that make up the bed of this industry have appeared in **CSD**, in considerable detail, before they became marketable products. Oliver Swan and then Hayden McCullough broke the 'spherical' in **CSD**. Robert Coleman introduced the LNC system in **CSD**. David Barker introduced the single conversion, image reject, receiver in **CSD**. And so on.

Yet, in the past year or so, there has been a marked decrease in do-it-yourself or construction articles. It is no mystery to me why this happened. First of all, anybody who has clever, original ideas has learned by now that if you rush them into print in **CSD**, you blow your first option of taking the circuit or device 'to market' on your own. David Barker published his single conversion receiver design details here, and several people virtually beat him onto the market with their own, starting with his **CSD** description, to get them launched into business. David worked out a good deal (I assume) with KLM so he came out alright. But there is not much incentive to give away your hard earned knowledge when everyone around you is pocketing the long, green stuff with their own clever ideas.

That's part of the problem. The other one is that in 1979, or 1980, we had lots of David Barker type people involved in our industry. We were not very big then, but perhaps half of the people reading **CSD** knew how to use a soldering iron, select a FET out of a box without blowing the delicate device, or tweak on an antenna feed. Now we are bigger, and proportionately the engineers and innovators make up a much smaller **percentage** of our universe. I doubt one reader in ten ever held a soldering iron to a FET, or even a resistor. The same thing happened with home computers, amateur radio; you name it. Anytime something gets 'popular,' we end up with something approaching 'mass appeal,' and if the 'masses' were all engineers the world would be a strange place indeed.

I am on occasion severely chastised for not printing more technical, hands-on stuff. Then when I do, I write about the things that occupy most of my waking mind (such as keeping this Caribbean nation supplied with satellite-fed television), and some guy tells me to quit talking about waterproofing fittings or corrosion. I am always willing to share my experiences (if you can stop me long enough from correcting the latest emergency problem). I haven't been a manufacturer since 1975, when I sold out a company that I founded in 1970; a company that manufactured CATV electronic gear. And I have long since lost any pride of authorship for whatever it may be that I discover in an electronic hardware area.

So how do we get non-Cooper technical stuff in print. I beg, I cajole, I intimidate. I plead. To no avail. So I am willing to try another tact. I would love to see a couple of short (say 500 word) technical shorties here each month, plus at least one really good project article per month. Here is how I intend to attempt to get the submissions into **CSD**.

- 1) Starting immediately, anyone who sends in a technical article or a short piece dealing with some technical subject will get prompt, two-week consideration. If we can't or won't use it, you'll get it back in two weeks.
- 2) If we can use it, you have just won yourself a one year renewal to **CSD**. \$50 if you are a statesider. If you happen to get lucky and get two or more into print in one year, you'll get paid in cash the dollar equivalent for any subsequent material published.
- 3) Now, to make this really interesting, at the end of each year, in our January issue (1983), we will run a complete list of all of the materials published in this 'contributed category' and provide a voting sheet. You, the reader, will then 'vote' for the best, most

popular, most helpful (by whatever criteria you select) "contributed piece" of the year. This being a short year, the odds are pretty good for the first year entrants.

Having selected, by a reader-poll, the best of the year, then what? This is where the fun starts. The writer/submitter of that piece will then 'win,' from **CSD**, a fantastic trip of a lifetime. The reader will get himself (and a friend, wife, whatever) as far as Fort Lauderdale/Miami. **Then we'll pick up the tab**, and you will leave Fort Lauderdale on the legendary Ed Hegner D/H-18 flight out over the Bahamas and to the Turks and Caicos. This may well be your first experience in a (small) 8 place airplane loaded up with 14 other friendly people, three dogs, four chickens and 10,000 pounds of baggage. On Provo you will have luxurious accommodations at the Island Princess Hotel, right on the Provo north shore beach about a mile west of the WIV installation. The Island Princess ("IP" locally) attracts a wide variety of Europeans and Canadians and Americans, and offers snorkel and scuba diving, sailing, fishing and plenty of local 'color.' On us, you'll stay a week. You may decide, like SPACE President Tom Humphries did last summer when he came down for three days, that you can't leave this place. Tom stayed 10 days and regretted leaving even then.

While you are here, you'll have the option of totally running the WIV television system for a full day. After a qualification course, we'll turn you loose in the control room and you'll run the commercials, do the station breaks, adjust the equipment and keep us on the air. If you elect to do that for a day, Susan, the children and I will take off and go swimming!

So much for the travelogue. Again, the 'rules.' Sit down and prepare something for submission to **CSD**. There are two categories; short pieces that deal with some handy trick or 'technical hint,' and, longer (typically not over 1,500 words) construction, equipment modification, or system installation topics. Each calendar year is a 'voting period,' and 1982 is already well on its way so the competition the first year will be easier. The first time we print your stuff, you get a one year **CSD** renewal. The next time we pay the equivalent of the renewal fee in U.S. dollars. At the end of the year, the readers 'vote' on the best piece for the year. And the rest will be history.

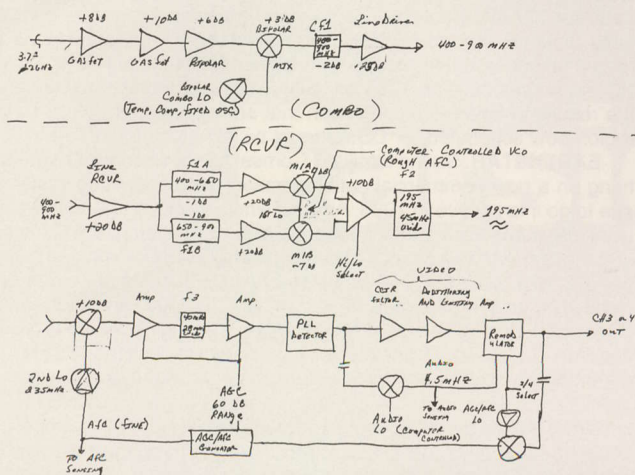
ROHNER'S PROBLEMS

John P. Rohner, operating under various names but usually with the family 'Rohner' included, has called it quits in West Liberty, Iowa. A report appearing in the Cedar Rapids (Iowa) Gazette on February 10th notes "**A West Liberty company engaged in the manufacture and sale of consumer electronic products has filed a bankruptcy petition in Bankruptcy Court in Cedar Rapids.**"

"J.P. Rohner and Associates, Inc., which went into business in March 1980, listed \$130,715 in debts and \$69,470 in assets. John P. Rohner was listed as principal stockholder in the company."

John first came to the attention of the industry in the spring of 1980. He advertised in **CSD**, offering various kits for the home builder. Many of the kits were copies of Taylor Howard and Robert Coleman projects, appearing in either their respective STT manuals, or here in the pages of **SSD**. The first flack we had on Rohner came early in the summer of 1980 when people who had ordered these kits were having difficulty getting delivery of what they paid for. Rohner subsequently designed a receiver that would have been the forerunner of the present LNC/demodulator packages. Rohner's unit was to have the LNA and down converter at the antenna, and the IF and demodulator at the viewing position. Rohner promised to ship 50 of these units the first month (July 1980), and to show it at the San Jose SPTS. To the best of our knowledge no receivers were ever delivered. Rohner subsequently brought out a 'basic' receiver, at a low price, which he advertised widely. Buyer dissatisfaction however doomed this product as well, and numerous buyers were forced to go the lowa consumer protection and legal authorities to seek refunds of their money. Most recently Rohner has attempted to hold industry trade shows (his Las Vegas show scheduled this past January was 'canceled' for lack of interest), start a national trade association, and engage in the publication of a monthly journal. In an earlier court action, Rohner was taken to court by his sister Elizabeth and his brother-in-law when they could not obtain an accounting of monies they reportedly had invested in John's company.

Rohner was probably no worse a 'character' than many others who nip along at the fringe of this industry. John's biggest problem was making promises he could not fulfill, and perhaps he should have been listening more often and talking less often. We have kept his sketch he sent to CSD, nearly two years ago, showing us how his super receiver was going to lay out. It appears here for the record and like so much of what John 'dreamed,' it showed promise.



There is a lesson in John Rohner's bankruptcy for all of the industry. Being bright is not enough. Being aggressive is not enough. Success, if there is to be success in a new field such as this, will come

only if a person has the talent to stick with his dream **and follow it through to completion.** Walk before you run, build it and make sure it works **before** you shoot your mouth off, and when you are wrong, admit it. This is still a very small industry, and if you mistreat or mislead those who would be your customers, in no time at all you will have no customers . . .

PACKAGING YOUR OWN

Part of the attraction of satellite service is the relatively low costs associated with the satellite link portion of the system. If you can deliver a videotape of a one hour program you want 'on the bird', to the uplink site, you are looking at around \$750 per hour transmission time for use of the uplink transmitter, the bird, and the tape play back gear at the uplink site. In prime time. In off hours, it comes down to less than half of that.

If rock fans will support a weekday night program through local clubs, why not other similar groups as well? Anyplace you can pack in a crowd, and protect the 'gate' (i.e. police who get in to watch the feed), offers an opportunity to 'go national' with some type of program service feed. Roller rinks, for example, will hold hundreds of people. People go there because they have a singular interest; skating. Given that interest, you have a 'theme' for a program feed. Figure out how to package the program, and how to make it financially attractive for the roller rink operators, and you are in business. If someone beats you to roller rink feeds, there are more bowling alleys than roller rinks, and the same possibilities exist. If that one turns out to be taken, there are municipal owned swimming pools and recreation centers. The list is not endless, but it is long. And any of these concepts would create a nice 'little' business for a fellow who has the ability to put the pieces together. Good hunting!

TRANSPONDER WATCH

RECENT REPORTS OF ACTIVITY ON DOMESTIC / INTERNATIONAL SATELLITES

Send your reports to CSD Transponder Watch, P. O. Box 100858, Ft. Lauderdale, FL 33310. For late news, call (305) 771-0505.

CANCOM scrambled service, via ANIK 2 and 3, has gotten more expansive also, as the date for encryption gets closer. CANCOM literature states that they can address each decoder and 'turn on and off the encryption.' The literature also suggests that the computer can tell if the decoder is on or off. A pretty neat trick with a one-way satellite transmission! Truth is far simpler. Each decoder does have an address, but when the 'computer' addresses that particular unit, it is simply telling it to turn on and off decoded output. The same effect is obtained by rewiring the unit so that it is 'always on'; something many Canadian experimenters are about to find out. CANCOM now suggesting that it would like to serve U.S. cable systems as well, if FCC/Canadian policy can be worked out.

BIG time stuff. Ten 12 GHz transponders have been leased by a firm calling itself United Satellite Television, on the new ANIK C satellite. The C bird will be the first operational 12 GHz bird in North America (present ANIK B has 12 GHz capacity, but it is limited to experimental purposes). C will provide, the Canadians forecast, useful service contours over approximately the northern 50% of the U.S.A., as well as Canada. United Satellite will program pop and country music service channels and movie services; they are paying \$25 million for the right to use 10 of the C bird transponders for a year. In 1984, they intend to switch over the new GSAT (U.S. operated) 12

GHz band bird.

ON again, off again German-French DBS program for 12 GHz is on again. They were to approve initial \$177 million expenditure late in March, to move ahead with design of satellite and ground support and control equipment. They are shooting for a mid-1985 launch date.

MEANWHILE Austrian government, apparently feeling threatened by decision of French and German to joint-project effort, is facing decision. One possibility is to build own DBS bird; another is to joint-venture with Swiss. Decision expected by mid-summer.

ARIANE launch scheduled for last ten days of this month; two satellites to be on board, including new Italian Sirio 2 experimental satellite.

ITALY now planning ITALSAT bird which will include, among other experiments, a 40 GHz down (50 GHz up) satellite transponder. Also on board ITALSAT bird will be up to six 20 GHz down/30 GHz up 20 watt transponders for telephone service, and three 30 watt transponder wideband transponders in same band, for video.

U.S. efforts, meanwhile, to launch and test 20/30 GHz (or higher) space communication experiments are getting poor support from budget conscious federal fund manipulators. NASA had hoped to fund experimental bird with 20/30 GHz on board, but for now the project has been shelved. Primary advantage to super-high frequencies is ex-

ceedingly small antennas possible, and very wide bandwidths (up to 1 gigabit of data per transponder).

FIGURE this one out. If true, the ramifications are unlimited. A computer data company in New York City wants to install, using a SATCOM bird (F4 for example) a link between U.S.A. (NYC) and Barbados, deep in Caribbean. Then, they will ship bulk data to Barbados via high speed facsimile (on satellite), where **'low cost keyboard labor'** will punch and process the data for re-entry into a computer program. Then the data, having been hand-worked for computer use, will be shipped **back to NYC**. The concept is that computer program preparation time, for data, is **far cheaper in Barbados** than it is in U.S.A. And just as many manufacturers of electronics **hardware** have gone outside of U.S.A. to build equipment, so — too will computer data processing firms also go outside of U.S.A., via satellite, to get their hand work done. And who said satellites wouldn't change the world!

Just when we are starting to get used to operational characteristics of Intelsat V birds (now barely one year old), word is out that **VI** series birds are about to be awarded to Hughes at \$75 million price tag each, and a near billion dollar total group buy price.

THE future of G(h)orizont 2 at 14 degrees west, the familiar Russian/Asian service seen throughout a large portion of Africa, South America, Europe and into portions of North America, may be in doubt. Russians are planing launch of an entire new family of birds, called **'Potok,'** and one will be at 14 west. Whether this will be an increased (transponder) capacity bird **with** video capabilities, or a **'data only'** satellite as some Soviet sources suggest, remains to be seen. Others will be located at 168 west and 80 east. Launch dates not known.

IF you are trying to put in a 5 meter or larger TVRO dish, and you worry about whether F3R is located in the middle, or edge, of its drift-window, you can obtain the exact position (within the window), and, the next orbit drift window correction thruster firing date from RCA; (201) 827-9400.

MEXICO may be serious about sticking a domestic bird inside of, or very close to the U.S. orbit belt, afterall. The Mexican government has registered as 'their orbit spot' 102 west (3 degrees west of Westar 4 home); with international Swiss regulatory and registration group. They will call their bird 'Ilhuicahua.' Translation, anyone?

CBS has taken unusual approach to get the attention of FCC, Congress and anyone else that is in a position to help them get high definition TV into service. The network is asking for permission to build, in San Francisco, a 12 GHz transmitter, and to operate a 12 GHz terrestrial transmission service, to test the application of HDTV. If the FCC approves the plan, CBS will get the system operational and use the results to bolster its contention that some, or all, of the 12 GHz region now scheduled for DBS should be set aside for HDTV.

EARTHSTAR. Sound familiar? Comsat has chosen that name to hang on a new commercial satellite based remote sensing system, due to go into service in 1986. Anyone who can prove that they were using the name Earthstar in inter-state commerce before the Comsat announcement has a chance of **selling** full rights to Comsat. Remember that NBC paid \$50,000 to the Nebraska Educational Television Network after they adopted their now famous logo, and then later discovered that the Nebraska group had been using it prior to the NBC decision. Go get 'em Earthstar! (And don't settle for less than \$50,000; remember, all satellite companies are made of money!)

DAYTIME, first cable oriented effort of Hearst (with ABC support), underway March 15 on TR22. Effort is largely created by Cosmopolitan Magazine crew and has lots of bucks behind it. Airtime is 1 to 5PM weekdays, eastern.

WEATHER CHANNEL now set to start operation May 2, 24 hours per day, on TR21. Launch date moved up to coincide with annual cable TV show held this year May 2-5 in Las Vegas.

AFTER APRIL 1, C-SPAN transition with dual feeds on TRs 9 and 19 over; only on 19 from this point forward.

HOME Theater Network now feeding 12 hours daily on TR16 with 'HTN-Plus' service. Christian Media Network, Episcopal TV Network both lost in shuffle that began with HTN holding onto a sliver of TR21 through the aborted sale from SSS to Premiere. When Premiere was ruled illegal, Landmark Communications acquired TR21 and that put squeeze on HTN, which by then was owned by Westinghouse. Westinghouse also acquired a major interest in Showtime at about that time, and it looked to Showtime resources for a home for HTN. TR16 has been in the Showtime stable since 1978, when it bought out Fanfare, a failing southwestern regional sports and movie service. If you follow that all the way through, you are a satellite veteran! Now Landmark is planning launch of full 24 hour Weather Channel Service on 21, and HTN Plus gets half day use of TR16.

Meanwhile, WOR's common carrier Eastern Microwave is waiting for shoe to fall. Eastern is to get a 90 day formal advance notice of when they must vacate TR17, which is also owned by Showtime. WOR could move to F4 or W4; and best bets seem to be it will switch over to W4, perhaps in a 'cozy deal' with Westinghouse.

12 GHz SBS service now offering bell-telephone-like satellite inter-connected long distance telephone service between 20 of the largest marketing regions in the U.S.A.

HOTTEST thing to come out of just completed **Fort Worth Satellite Business Opportunities Conference** may have been new industry understanding of how a typical 'Apple computer,' tied to a Southern Satellite Systems decoder which receives signals from the VBI data on F3R transponder 6 ... can interconnect the home, private, satellite terminal user with dozens of information and data sources. SSS President Edward Taylor, Gary Stanton, SSS VP of Engineering, and Steve Vetter of SSS 'CableText' were on hand in Fort Worth to describe, in detail, how the home terminal system can become a fully functional business tool for virtually any professional person. The concept that the home terminal can quickly, and quite inexpensively expand into a part of a national communications network opens up many new marketing opportunities for home terminal suppliers. The willingness of SSS to make their CableText service available to and through 'mature,' well run TVRO dealers as a selling tool to potential and existing customers speaks well for the growth of the industry. A full report in the May CSD. Details from SSS's Selman Kremer at (918) 481-0881.

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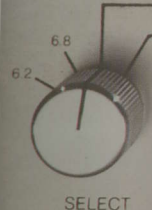
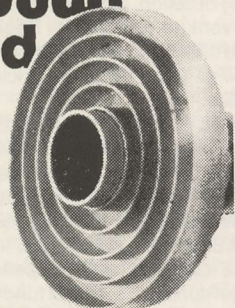
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Farsighted.

SYSTEM 7



System 7 Satellite Receiver and Downconverter... a higher level of performance and reliability.

System 7 Receiver

Excellent video quality. Experience System 7's superb picture quality. Once you do, you won't be satisfied with anything else. For simple tuning, System 7 uses detent tuning with separate fine tune control. Detent tuning provides accurate tuning to each satellite transponder (channel) with the click of a switch. Then, automatic frequency control helps zero in on each transponder. When fine tuning is needed, it typically spans only one transponder. Fine tuning on

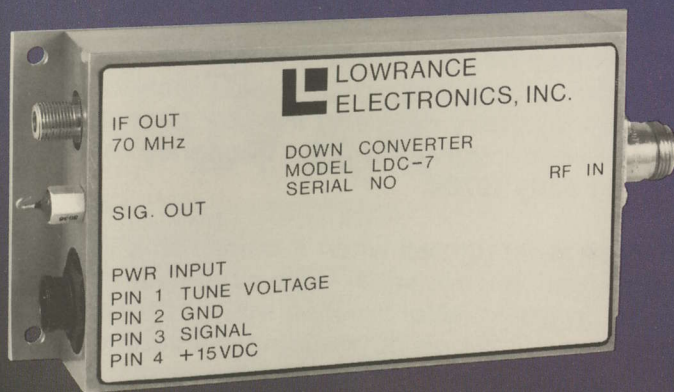
some competitive receivers tunes as wide as five transponders, making it virtually impossible to tell which transponder is being received.

Versatile audio tuning. Common audio subcarriers such as 6.2 or 6.8 MHz can be selected with the audio switch. Variable tuning is available for reception of less common carriers. System 7 also has dual variable tuning to receive stereo. This type of stereo transmission, called "matrix" stereo, is now used in almost all stereo satellite transmissions. The older "multiplexed" stereo system used on some receivers is virtually obsolete.

Attractive styling. System 7 represents a new generation of compact satellite receiver units. Its brushed aluminum front panel and sleek styling blend with any setting.

Additional features. System 7 has a signal strength meter to aid in tuning and antenna alignment, plus a video invert switch to allow viewing of programs with inverted signals. The built-in modulator permits viewing on a standard television set with no external wiring. Alternately, output jacks provide direct connections for a stereo amplifier, VCR or cable system. All power is provided for the downconverter and L.N.A. from the receiver.





Downconverter

This is the second integral part of System 7. The downconverter utilizes single conversion techniques with excellent image rejection characteristics. Its weatherproof design and R.F. shielding provide for safe, efficient outdoor installation, and this means less expensive cable runs. It can even be hosed down when cleaning the antenna. Signal strength can be viewed right at the downconverter to help align the antenna, with the aid of a simple DC voltmeter.

Remote Control

Convenient armchair control can be obtained with an optional remote control unit which has detent tuning and separate fine tune.



Rack-Mounted Option

A rack mount faceplate option is available for commercial applications.

American-made Reliability

System 7 is backed by a one-year FULL warranty. Each unit must pass more than 50 quality checks and is burnt-in (run under normal operating conditions) for several days to insure maximum reliability.

**LOWRANCE
ELECTRONICS, INC.**

12000 E. SKELLY DR., TULSA, OKLA. 74128

The Lowrance Story

With over 25 years' experience, we've mastered the art of listening — electronically.

Lowrance Electronics began by pioneering the field of sportfishing sonar in 1957. Lowrance has remained the world's leader in the field through exceptional engineering, utilizing the latest micro-processor technology, and continuing commitment to quality. Despite more than 200 competitors, no one has ever been able to match our exceptional quality and reliability.

But Lowrance doesn't stop there. We are active in many other areas, ranging from laser technology to a medical telemetry device to monitor pacemakers. We have been involved in radio frequency research since the early 1970s.

Lowrance is farsighted when it comes to satellite communications. We know full well that to remain a leader in the satellite receiver market 25 years from now will take an outstanding commitment to excellence. We are ready to meet the challenges of today . . . and tomorrow.

System 7 Specifications

Downconverter

Features

- Single conversion — image reject
- Weatherproof & R.F. shielded design
- Output provided for signal strength indication

Physical

Size: 6.5" x 3.3" x 1.3"
Weight: 1 lb.

Environmental

Temperature: -30° to 60° C (operating)
Humidity: Up to 95% relative

Power

15 V.D.C. (from receiver)

General

Frequency range: 3.7 to 4.2 GHZ
I.F. output frequency: 70 MHZ
I.F. output impedance: 50 OHMS

Connectors

R.F. input: N type
I.F. output: F type (internally sealed)
DC power: 4 pin circular type (supplied)
Signal strength output: Insulated pin connection

Receiver

Features

- Video tuning: Detent tuning, variable fine tune, A.F.C.
- Audio tuning: Selectable tuning for 6.2, 6.8 MHZ, variable and dual variable tuning, two variable tuners
- Metering: Relative signal strength
- Modulator: Built-in (channel 3 and 4 selectable)
- Direct audio and video outputs
- Video invert switch

Physical

Size: 12.5" x 10" x 2.8"
Weight: 9.1 lbs.

Environmental

Temperature: 0° to 40° (operating)
Humidity: Up to 95% relative

Power

117 VAC, approximately 30 watts for receiver, L.N.A. and downconverter

General

I.F. frequency: 70 MHZ
Bandwidth: 30 MHZ

Video

Format: 525/50 or 60
Polarity: Positive or negative
Output level: 1 volt p/p
Output impedance: 75 OHM unbalanced

Audio

De-emphasis: 75 microseconds
Output level: 800 MV (@ ± 75 KHZ deviation)
Output impedance: 1 k OHMS unbalanced

Connectors

Video output: RCA phono jack
Audio outputs: RCA phono jacks
I.F. input: F type
DC power: 4 pin circular type (supplied)
R.F. modulator output: RCA phono jack
Power: 3 prong AC plug (supplied)

Rack Mount

- Standard 19" rack mount, 3 - 5" high

Remote Control

Features

- Detent tuning
- Variable fine tune

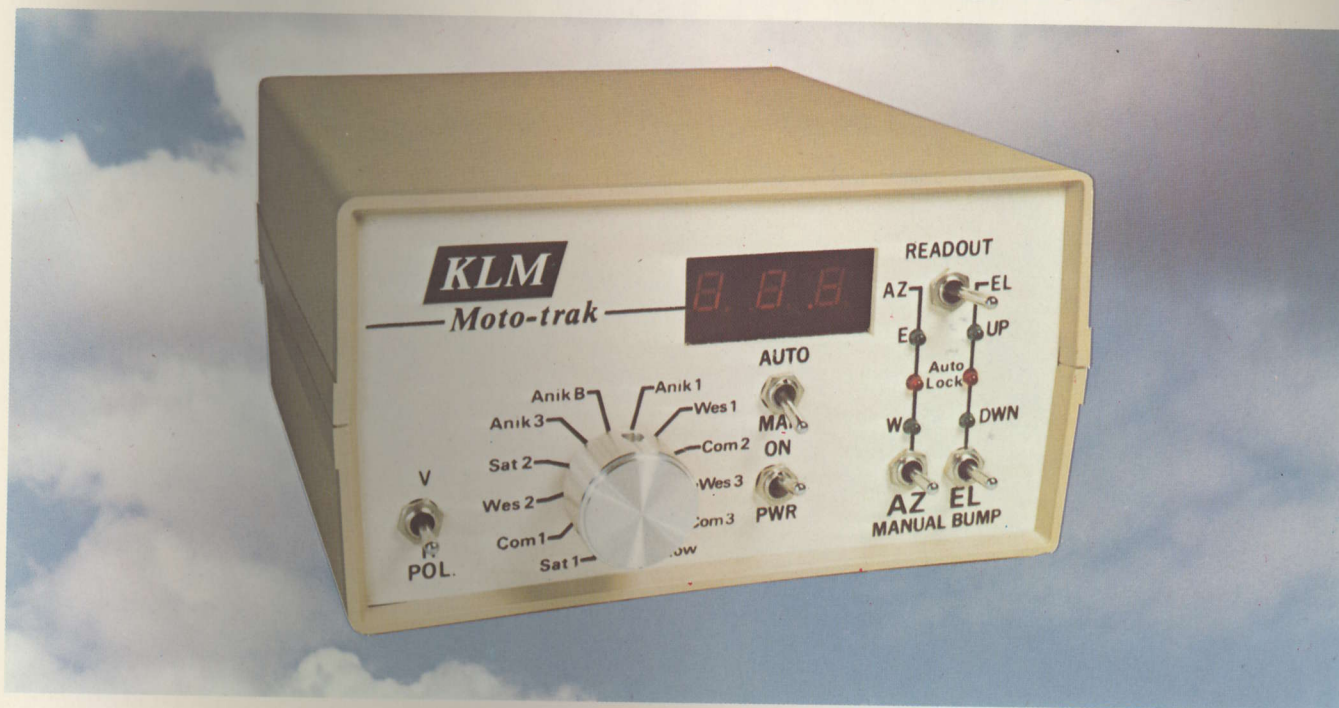
Physical

Size: 4.5" x 2.5" x 1.5"
Weight: 6 oz.

Specifications subject to change without notice.

Note: The System 7 receiver, as a part of a complete TVRO system, has the ability to intercept transmissions not intended for you as a viewer/user. Such transmissions are protected by Section 605.501, and Title 18 U.S.C., Section 2, of the Communications Act of 1934, as amended. The legal rights of individual home viewers have not been determined fully by the Federal Communications Commission nor by a competent court of law. Protected, private transmissions, via satellite, should only be intercepted with the permission of the transmitting agent or agency.

Moto-trak



Your key to ALL the satellites, ALL the programming, right from the comfort of your easy chair.

Satellite television offers so much to explore. Why settle for the one-satellite limitation of fixed dishes, or endless cranking at the dish in all kinds of weather? Enjoy all the convenience KLM's Moto-trak system has to offer . . .

- 12 automatic satellite selections at the twist of a dial
- Fully independent Azimuth and Elevation control, to search or optimize
- Spot LED "travel" indicators
- Constant LED Azimuth/Elevation readout
- Polarity Control, for all channels, horizontal and vertical
- 12' solid aluminum dish or 16' screened dish for a perfect picture

And, enjoy the reliability of a motorized mount that's precision engineered from the ground up. Not an afterthought or a flimsy add-on, KLM's Moto-trak uses industrial quality reduction motors, gear, and screw drives, state-of-the-art motor control electronics.

Best of all, the Moto-trak system is a perfect match for KLM's reliable SKY EYE II and new SR-3 Satellite Receivers. Complete systems are available NOW. Once again, more of the performance, features, convenience, and reliability you've come to expect from KLM.

KLM
P.O. Box 816, Morgan Hill, CA 95037
(408)779-7363

Send for KLM's
SITE SURVEY KIT
AZ-EL Tester, Manual,
Sat-Coordinates \$29.95

SAT-TEC™ R2B

The leader in low cost TVRO



The R2B, the most highly integrated receiver on the market today!

Sat-tec

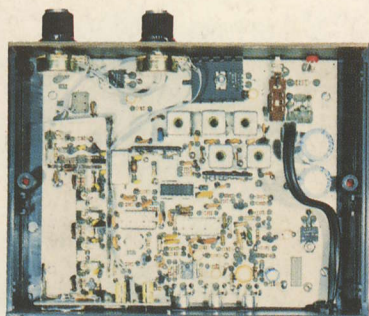
The name you know FIRST!

- FIRST Low Cost Receiver
- FIRST Volume Production
- FIRST With Off-Shelf Delivery
- FIRST To Ship the Innovative Divide By 2 PLL
- FIRST With Channel Lock AFC

The Sat-tec R2B receiver is our latest full feature receiver, tailored to commercial equipment specifications at a price you can afford. the R2B's single board construction eliminates problematic interconnections and

innovative utilization of all components results in a reliable and proven design. Operation is simple—a single tuning knob does it all, and our unique Channel-Lock AFC keeps the tuning sharp and accurate. A new feature is our variable audio tuning to give you complete selection of all subcarriers—without the use of additional plug-ins or devices. This, together with the R2B's full frequency coverage makes it truly compatible with all domestic and international satellites.

For superior value as well as lowest system cost, the choice is but one—the R2B! See your dealer today or write to us direct.



SPECIFICATIONS

Frequency range:	3.6-4.3 GHZ tunable
Audio range:	5.2-7.6 MHZ tunable
Threshold:	8db CNR
IF bandwidth:	30 MHz for full fidelity video
LNA power:	15 volts regulated for up to 2 LNAs
Outputs:	Standard one volt audio and video, compatible with VCRs, monitors and modulators
Optional:	BC-1 RF modulator kit, tunable channels 3-6 with sound



Sat-tec Systems

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